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PHILADELPHIA

SELLING  
ARGUMENTS  
FOR  
TIN ROOFING







# Selling Arguments *for* TIN ROOFING

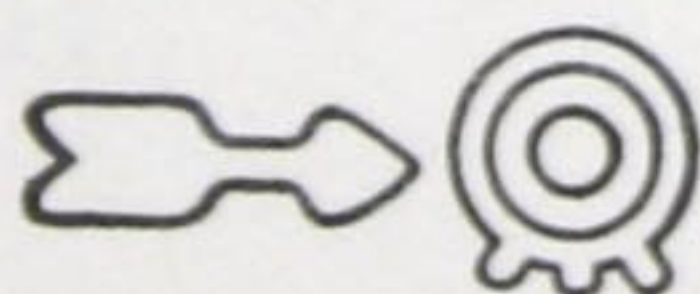
*A review of the advantages of  
roofs of this type*

A textbook containing corrected tables for use in estimating, instructions for laying tin roofs, description of the manufacture of roofing tin, and a large amount of information useful to the practical man.

*Illustrated*

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FIRST EDITION  
1911



*Prepared for the  
Sheet-Metal Roofing Trade by*

N. & G. Taylor Company, Philadelphia

Established 1810—102d Year



## DEDICATION

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*To our friends in the trade: those who are with us to-day, and those who have gone before; to all those who by their patronage through more than one hundred years have, perhaps unwittingly, helped to support and build up this enterprise, this volume is dedicated.*



# Preface

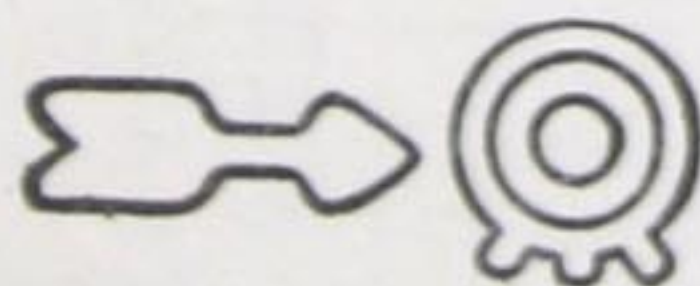
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We have prepared this book with the idea of giving sheet-metal workers a number of arguments in compact form, for use in pushing the sale of tin roofing.

Keep this book for reference, and show the illustrations to any one interested in the roofing question. If contracts for Target-and-Arrow tin result we shall feel well repaid for our work.

N. & G. TAYLOR COMPANY.

*Philadelphia, June, 1911.*





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# *Selling Arguments for* **TIN ROOFING**

The chief advantages of tin roofing can be summed up briefly as follows:

1. **Durable.**
2. **A time-tried, long-established material.**
3. **Easily applied.**
4. **Adaptable to any surface.**
5. **Moderate first cost.**
6. **Low cost of maintenance.**
7. **Re-use, second-hand value.**
8. **Easily and quickly repaired, if damaged.**
9. **Neat, high-grade appearance.**
10. **Loses nothing in appearance with age.**
11. **Light in weight.**
12. **Not affected by heat or cold.**
13. **Gives protection against lightning.**
14. **Incombustible, and prevents spread of fire.**
15. **Weatherproof.**

All of these advantages are well known to you. From your own experience you will be able to give many cases to illustrate them. We are giving, however, some illustrations from our own files, with photographs that will interest the man who wants a first-class roof.

Let us take up these arguments one by one.

## **1. DURABILITY.**

Every roofer knows of old roofs of good tin, as well as roofs laid in recent years, that are still in as good condition as when first put on. If there is any limit to the durability of a roof of good, heavily coated, hand-made tin, properly laid in accordance with standard practice, it has not yet been discovered. There are on record many old tin roofs that have been found in good condition after seventy-five years or more in service, and the same good results can still be had if the hand-dipped tin, made in accordance with the standard of former years, is used. Satisfactory results in tin roofing have always been a matter of good material and good, thorough workmanship, and, fortunately, both are as readily obtained to-day as they were fifty years ago.



For evidences of durability let us take the following cases, including not only old roofs, but many roofs laid in recent years, to show that durable roofing tin has always been obtainable:

Judge Morse's office building at Cherry Valley, N. Y., was roofed with heavily coated, hand-made tin in 1813; roof about one-quarter pitch. This building was demolished in the spring of 1908, and at that time the roof was found to be in good condition *after 95 years' service*.

Another tin roof on a store building at Chazy, Clinton County, N. Y., is still giving satisfactory protection *after 87 years*.

The residence of Miss Jane Bierne, of Huntsville, Ala., is one of the show places of the South. A portion of this house was covered with our tin *44 years ago*, and because of the remarkable service it has given, the same tin was selected recently to replace the shingles on the main part of the building. The old roof covered with our tin was not disturbed, as it is still good for many years to come.

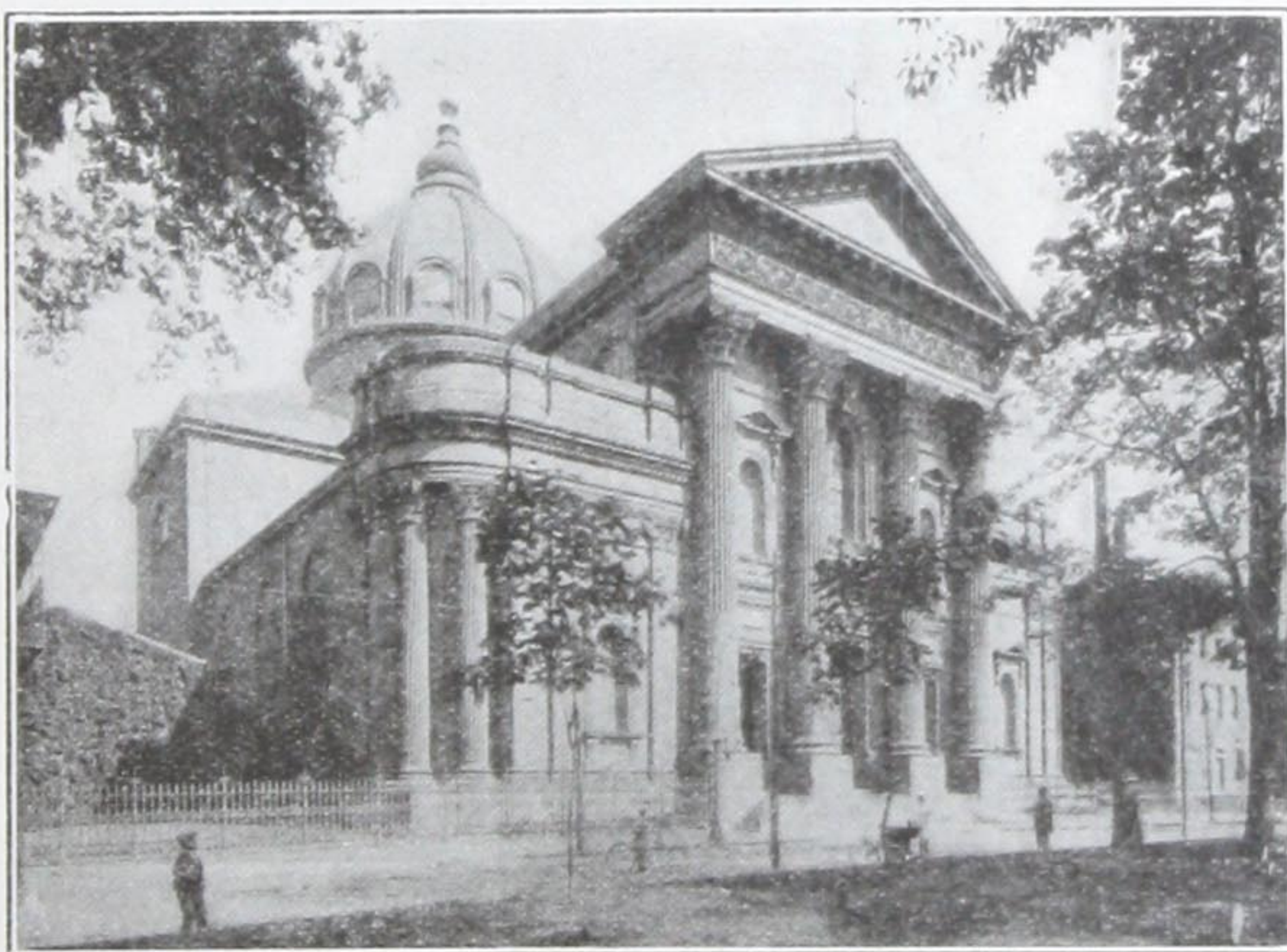
An old roof of good tin was recently reported to us from Pittsfield, Mass. This roof, put on in 1825, was found, upon examination, to be in good condition *after 83 years' wear*.

The Julian Batchelor Co., of Utica, N. Y., recently reported a roof of good tin still in first-rate condition *after 90 years* of service. A sample of this tin was sent to "The Metal Worker," and reproduced in their issue of May 8, 1909.

The Perkins residence at Clyde, N. Y., is roofed with our tin put on in 1851. The roofer—a strong partisan of ours—reports that this roofing is in first-class condition. He says: "This was your tin; nothing better in the world to-day."

"The Metal Worker" of August 11, 1906, reported a roof put on in Bridgeport, Conn., in 1834, still in good condition *after 72 years' service*.

In remodeling the residence of Mr. P. H. Weldele, 1520 Ohio Street, Terre Haute, Ind., it was necessary to take down a 7' x 15' angle porch. The roof of our tin put on 21 years before was found in perfect condition, without a leak.



**1. DURABILITY:** In 1857—*54 years ago*—we furnished the tin used in roofing the dome of this structure—the Cathedral of St. Peter and St. Paul, Philadelphia. This tin has given satisfactory service, and is still in good condition.

In 1907, W. Sutherland, a roofer of Bath, N. Y., reported to the "Sheet Metal Workers' Journal," a tin roof on the Hon. Constant Cook homestead, put on in 1843, laid with standing seams—the first of its kind in Steuben County. At the time of his report the roof was still in good condition, and evidently good for years to come, *after 64 years' service*.

In 1857 our tin was used for the gutters of a shingle-roofed residence at Fulton, N. Y. This tin remained intact for more than forty years, wearing out two fine shingle roofs, until ten years ago, when a tin roof was put on, but was "locked on the old tin" covering the wide corners and gutters, which gives the original tin a constant use of over fifty years.

The Peters Hardware Co., of Emporia, Kansas, roofed its building in 1870 with our heavily coated, hand-made tin. In spite of the fact that this roof has been walked upon, run over with wheelbarrows, and subjected to other abuses, it is still weatherproof and giving good service.

The old part of the Bethlehem Moravian Seminary for Young Ladies was roofed with good tin in 1836. This roof is still in good condition *after 74 years' wear*. An adjoining building of the Seminary, erected at a later date, was originally roofed with gravel, but this blew off in a wind-storm and was replaced by a good tin roof thirty years ago. This roof, too, is in first-class condition to-day.



L. S. Thomas, a member of the Board of School Trustees at Martinsville, Va., wrote us on September 8, 1910:

"There is one roof in this town—and perhaps others—that was put on with tin from your factory in 1854. It is, so far as I can see, about as good now as when it was put on in 1854. I was born in that house; my father had it built, and my mother and sisters live underneath that roof now."

The old Sun Hotel at Bethlehem, Penna., is covered with a tin roof put on 53 years ago and in good condition to-day.

The store and residence of F. E. Luckenbach & Son at Bethlehem, Penna., are covered with a roof of good tin put on by F. E. Luckenbach forty years ago. This entire roof is in first-class order, and our correspondent states that "the tin is right on the job to-day."

Peter Kettenring, President of the Defiance Machine Works, reported in 1907 a building at their plant roofed with good tin in the fall of 1869, and used as a machine shop for a number of years—lately as an office and drafting-room. This roof has been painted not to exceed five times in its 38 years' service. It was put on with standing-seams, and is the only roof they have ever had about the works that gives satisfaction. At the time of the report, from appearances, it was as good as it ever had been.

The old building, known as the Music Hall Block, at Red Wing, Minn., was built in 1872 and roofed with our tin. This roof, together with a number of others erected in Red Wing at the same time, roofed with the same material, is in perfect condition to-day.



**2. DURABILITY:** This residence at Osnaburg, Ohio, was roofed with our tin in 1878. The roofer recently reported to us that all of this tin—the roof, downspouts, gutters, etc.—is in perfect condition.

visible from the surrounding streets, and is still in good condition. This roof has outlasted the roofing concern and the workmen themselves who laid it, with the exception of Adolph Mueller, an old sheet-metal worker, who is our authority for these facts.

The Blue Anchor Inn, an old Philadelphia landmark built in 1682, was covered 28 years ago with roofing tin, and this roof is in good condition at the present time. When this famous old tavern was built, it was located on the east bank of Dock Creek, a busy harbor for shipping in the early days of Philadelphia. William Penn is reported to have landed here upon one of his visits to Philadelphia.

The Horace Binney residence in Philadelphia on Fourth Street, below Willing's Alley, is covered with the original roof of hand-dipped tin put on about 1835.

Another building in Philadelphia, at 208-10 Chestnut Street, is roofed with good tin put on in 1859, replacing copper. This roof is still in good condition.

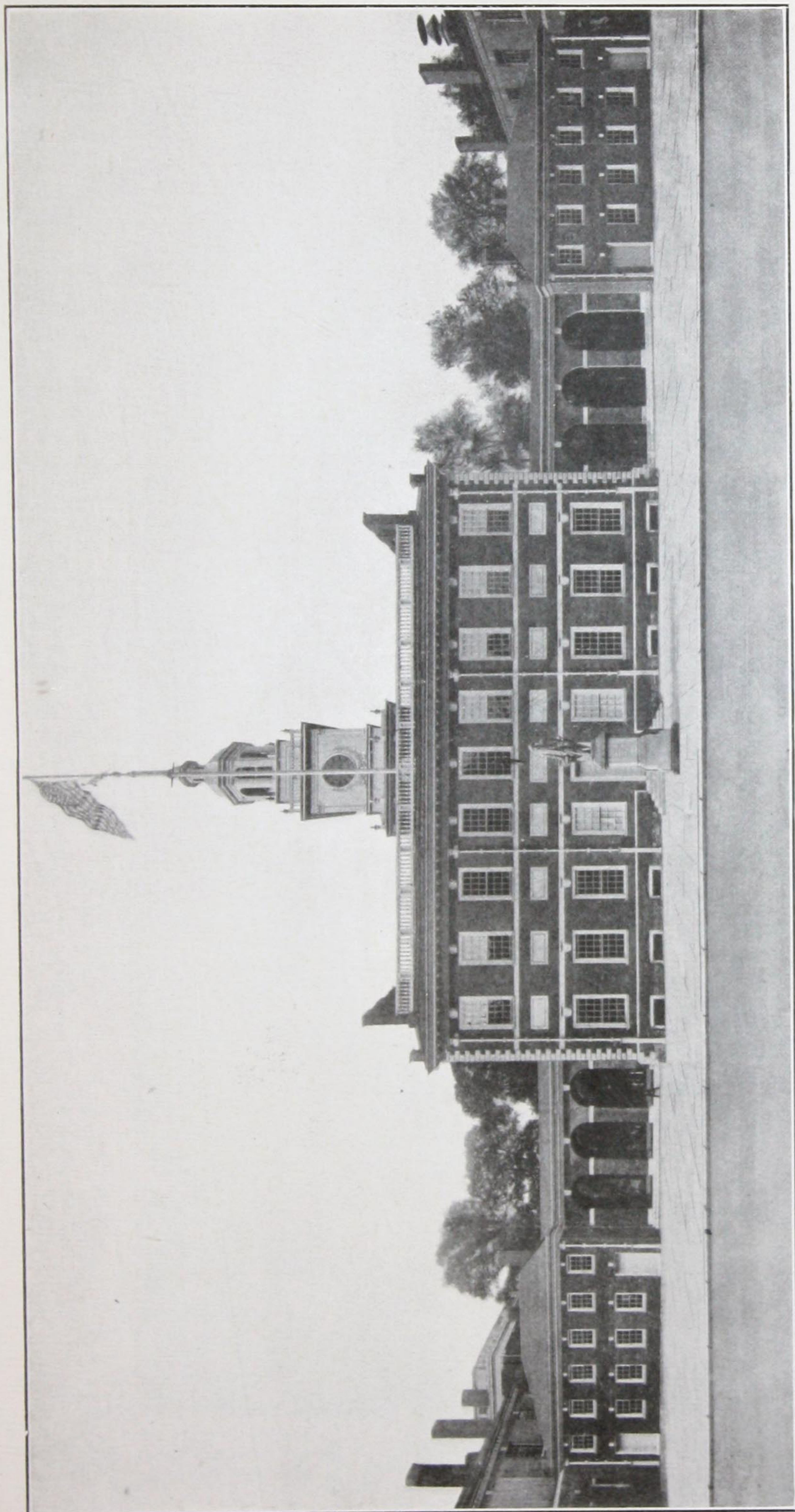
Old Swedes' Church, in Philadelphia, the oldest church but one in this country—founded

C. F. Greening, a roofer of Grand Meadow, Minn., wrote us August 14, 1907:

"I have used your tin for the past 35 years. I have a tin shop that I roofed with your tin in 1874. It never sprung but one leak. I think it good for another thirty years yet. I put on some eaves trough of your best tin in Wisconsin in 1862. It was still doing service on July 4, 1907. I have put on many roofs during the last 35 years. For good work I never use any but yours. I call it the best roofing on earth, and my roofs prove it."

The old Union Market House in St. Louis, which still stands on the corner of Broadway & Morgan, extending back to Sixth Street, one block long, is covered with a standing-seam tin roof put on in 1869. This roof is plainly

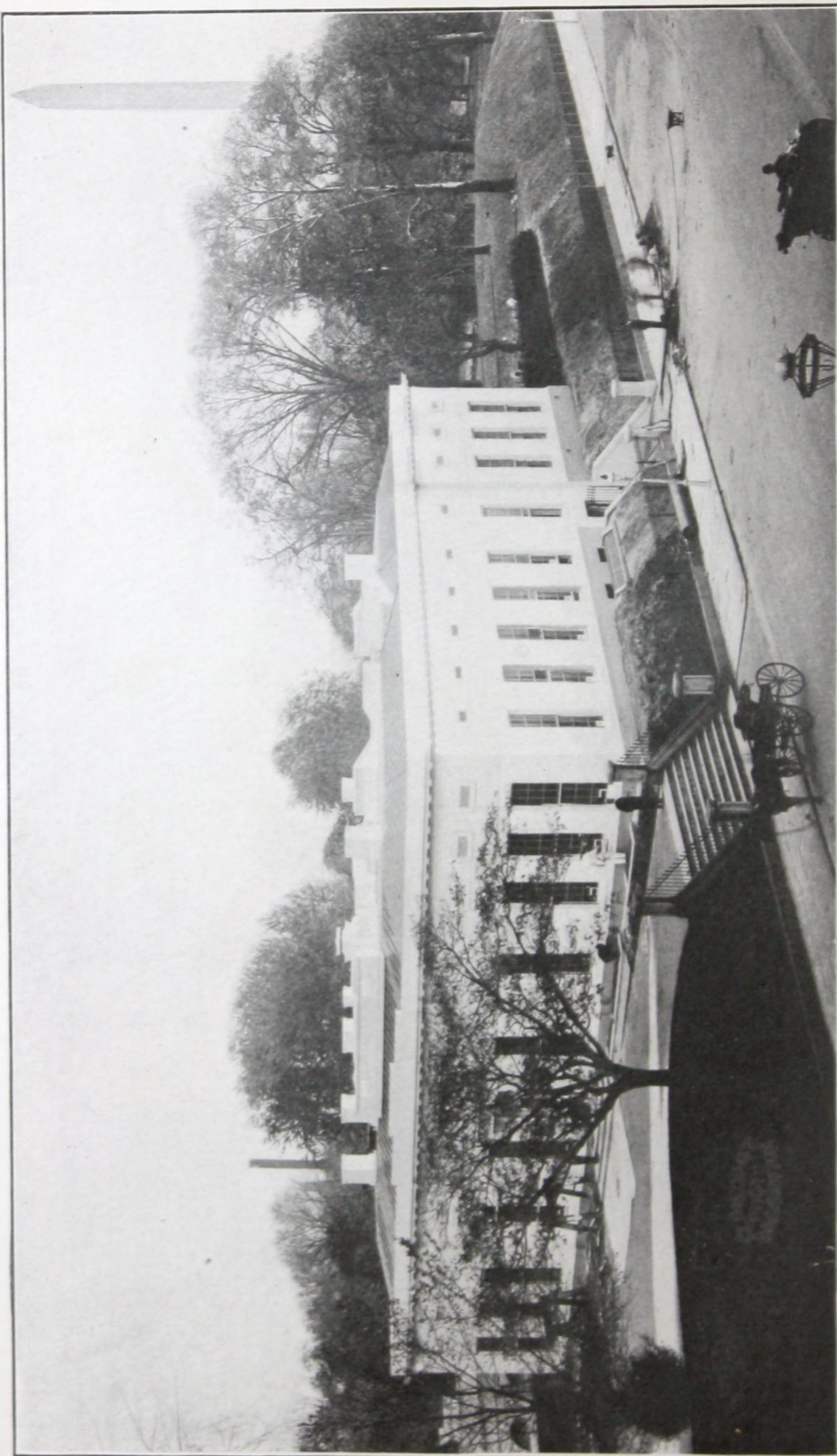




### OLD INDEPENDENCE HALL, PHILADELPHIA

This illustration shows the roof of our best tin covering the Nation's most treasured building, old Independence Hall, in Philadelphia, the Birthplace of Liberty. The main building of this venerable structure was originally covered with shingles, then with copper, which proved unsatisfactory, and finally, in 1887, with our heavily coated hand-made roofing-tin, the Target-and-Arrow brand. This tin roof has justified the choice of those who selected it years ago. Today, after 23 years' exposure to the elements, it stands in practically as good condition as when put on, and good for many years to come. A better proof of the value of the right kind of tin could not be shown. The home of the Liberty Bell affords an argument in favor of tin roofing that American sheet-metal roofers should present to any person who wants a first-class roof.





THE NEW ADDITION TO THE EXECUTIVE OFFICES, WASHINGTON, D. C.

Roofed in 1909 with our Target-and-Arrow tin. The illustration shows very clearly the neat, handsome appearance of the roof.

*Nathan C. Wyeth, Architect, Washington, D. C.*

*J. D. Thompson Co., Roofers, Washington, D. C.*



in 1677—is covered with a roof of our tin put on 25 years ago to replace shingles, on account of the danger of fire from sparks from passing railroad engines. This roof bids fair to last as long as this venerable building stands.

Another old landmark in Philadelphia, the Bloodgood Hotel, on Dock Street, was torn down some years ago to make room for the Pennsylvania Railroad freight station. When the roof was taken off it was found that our tin upon it was bright and perfect—just as good as when it was put on—although in active service 44 years.

The old colonial residence, known as “Woodlands,” in West Philadelphia, on the ground now occupied by Woodlands Cemetery, is roofed with tin. This mansion was built at the time of the Revolutionary War by William Hamilton, son of Andrew Hamilton, 2d. The original roof was shingled. In the early 70's W. S. Bonsall's Sons, now of 38th & Market Streets, put on a roof of good tin, probably—in their opinion—bought from us at that time. This roof is still doing good service after forty years.

The old building used as Washington's headquarters at Valley Forge is covered with a tin roof put on in 1878. This roof is in first-rate condition, and is painted with red oxide of iron every six or eight years.

When the old “Ship House” in Germantown, Penna., was torn down several years ago, the tin roof covering it was found to be in first-rate condition after more than forty years' service. Mr. Herman Burgin, of Germantown, reports this case, and adds:

“My own house has the original tin on gutters and on porch roofs, practically as good to-day as when they were put up in 1857-8, I think. A similar tin roof very foolishly was, a few years ago, taken off the Fellowship Engine House, about the same age, and in perfect condition.”

The old Garretson House at Flushing, Long Island, built in 1659, was roofed with our tin 31 years ago by the firm of Lewis Brothers of Flushing. This roof was still in good condition up to the time the property was sold, late in 1909, and evidently good for many years to come.

Another instance is reported where our tin has withstood the elements on a property belonging to the Garretson heirs, which was covered with our tin in 1867, and, as the owners state, is a very good roof to-day, and will without doubt remain so “for a good many to-morrows.”

An old tin roof is reported by James Lally, roofer of Dubuque, Iowa, put on in that city in June, 1857. The original owner was named Hollingsworth, but the property has since changed hands and has been remodeled for store purposes. The old roof remains in good condition.

A stone store building at Chazy, Clinton Co., N. Y., owned by W. H. Saxe, was roofed with good tin in 1822. This roof remains in good condition, resisting wear and tear and all attacks of the weather, for 88 years.

Francis Brechter, a veteran sheet-metal worker of Beaver Dam, Wis., now retired, used our tin in 1864 to cover a building on Main Street, now occupied by the Wollenberg Company. Mr. Brechter reports that the work was well done in accordance with the best practice, sheets fastened with cleats, no acids were used, and pains were taken to protect the tin from scratches. The roof was immediately painted with good paint and has been properly cared for since. It is evidently good for a long time to come.



**3. DURABILITY:** The residence of Mr. George L. Baker, at Selma, Alabama, was roofed with our tin in 1859. Since then it has never sprung a leak or required repairs of any kind, and is in as good condition to-day as when first put on.





**4. DURABILITY:** First Presbyterian Church, Princeton, N. J. Roofed with tin more than sixty years ago, and in good condition to-day. Sheets 10" x 14" size, laid standing-seam. Painted with mineral paint and linseed oil. No repairs have been necessary except renewing the gutters.

No. 6 Main St., in 1853. This roof is in good condition to-day. No repairs needed except when some lightning-rod men punched a hole in it.

Mr. M. Otis Hower, of the Akron-Selle Co., of Akron, Ohio, wrote us February 7, 1906:

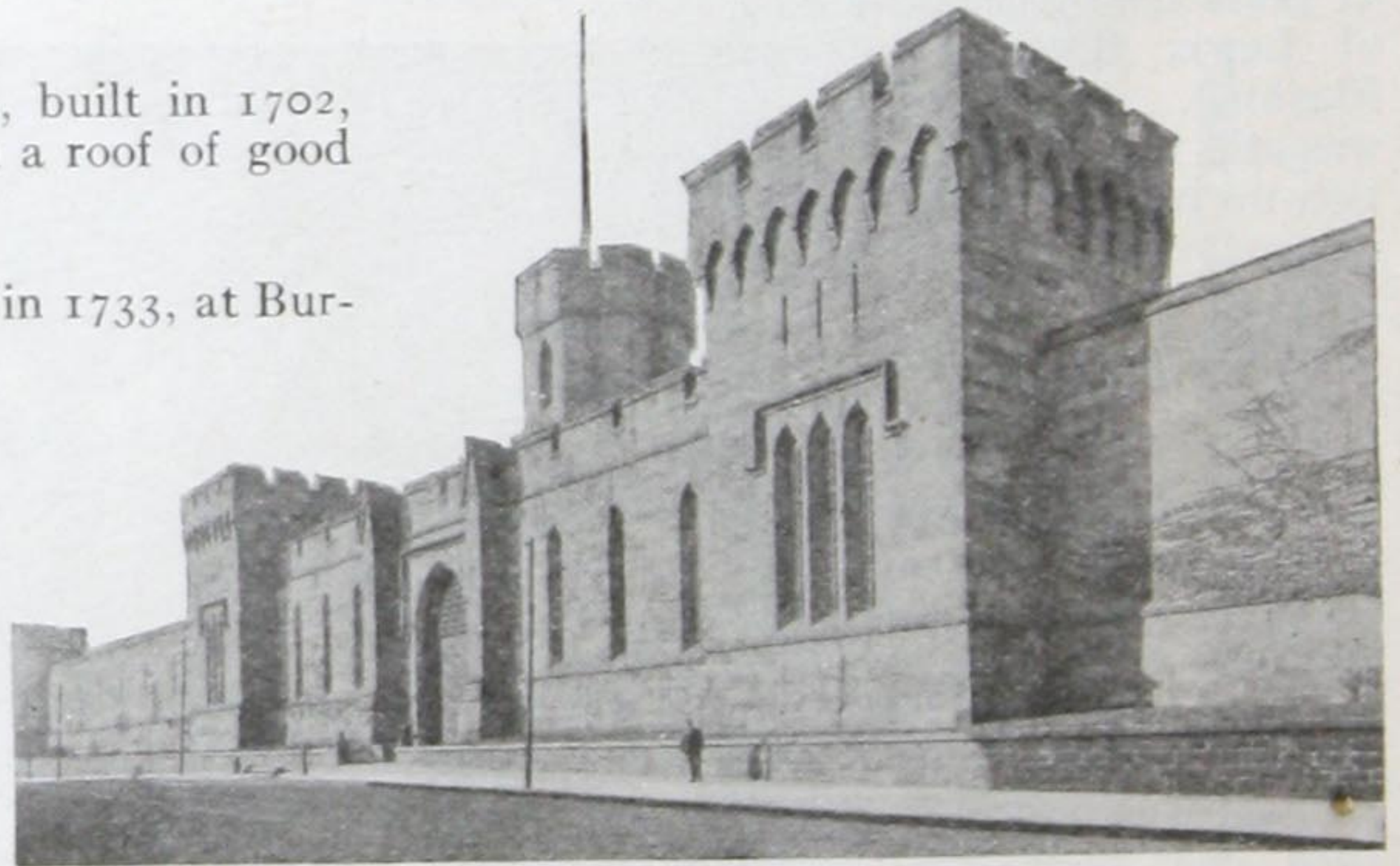
"My residence was covered with your tin in 1872, and is in just as good condition to-day as the day it was laid, and present indications are that the roof will last longer than the writer."

Old St. Mary's P. E. Church, built in 1702, at Burlington, N. J., is covered with a roof of good tin put on about 45 years ago.

The old Smith Mansion, built in 1733, at Burlington, has a 35-year-old tin roof.

John McFeat, roofer, of Spring City, Penna., reports roofs of our tin put on the residence of Samuel Deemer, in 1865, and William Priest, in 1869, still in perfect condition to-day.

Brown Brothers, of Montgomery, N. Y., reported to "The Metal Worker," in May, 1905, a tin roof laid *nearly eighty years ago*, terminating in a copper gutter. The tin, which is in 7" x 10" sheets, is described as being in better condition than the copper.



**5. DURABILITY:** Our tin is serving what will in all probability be a life sentence on the roofs of many of the buildings of the Eastern Penitentiary at Philadelphia. On the older buildings it has been giving good service for more than thirty years.



**6. DURABILITY:** The barracks at Fort Adams, Rhode Island, are all roofed with our tin, and furnish convincing proof of the durability of good tin along the seacoast.

A. C. Stephenson, 1222 Capital Avenue, Des Moines, Iowa, reported to us December 16th:

"A bay window of my home was covered with your tin in 1881. Same has never been repaired, and judging from its present condition—1908—it will outlast the next generation."

The residence of W. M. Gamble, at Moorefield, W. Va., is roofed withterne plate, put on in 1848 by G. Hutter & Sons, of Moorefield. This roof remains in excellent condition.

There are said to be many other tin roofs in the same neighborhood that are nearly as old, and in a good state of preservation.

George S. Newhall, tinner, of Taunton, Mass., put a roof of good tin on his shop,

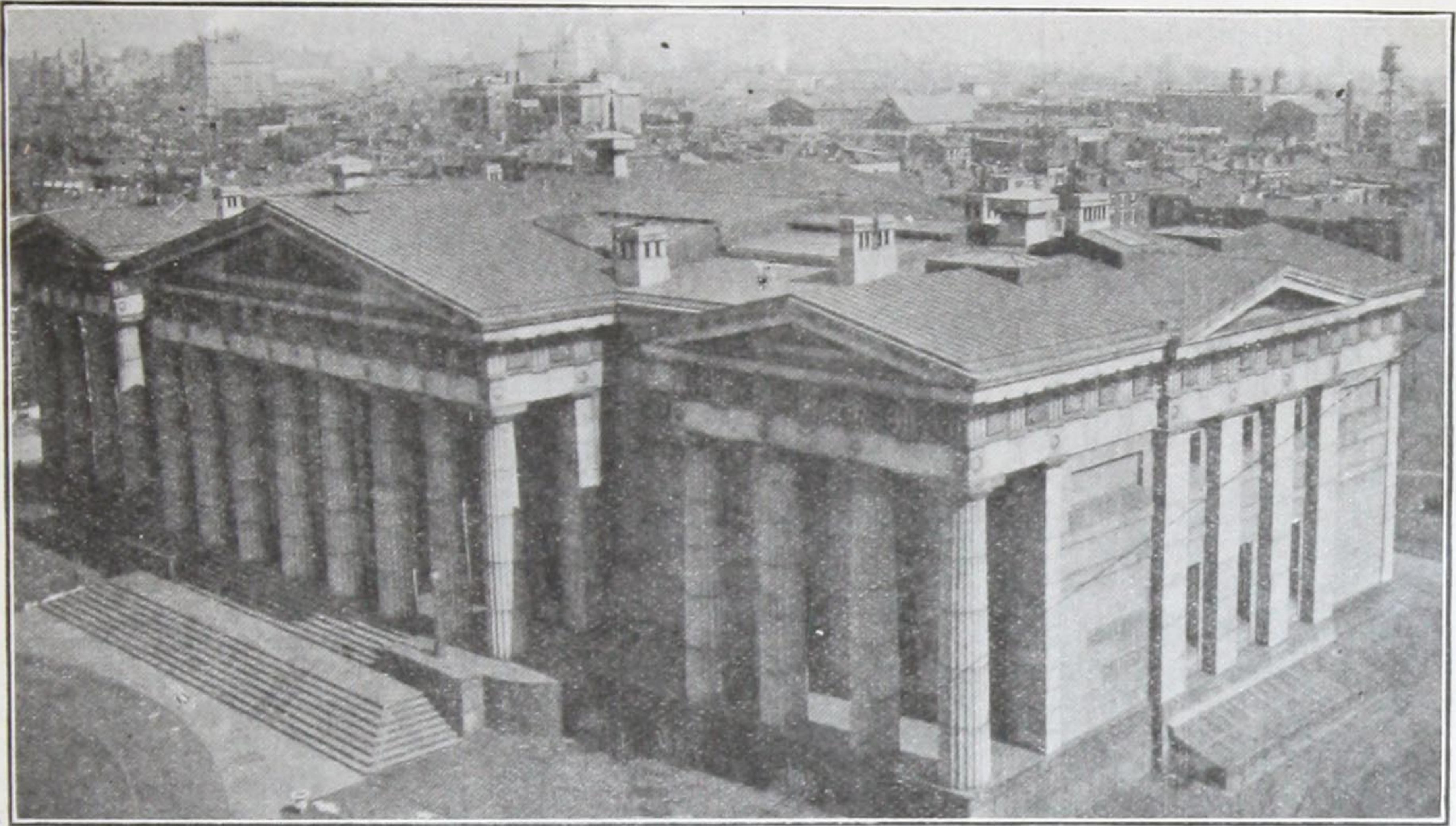
No repairs needed except when

John R. Packard, president of the Packard Hardware Co., Greenville, Pa., wrote us April 6, 1905:

"The tin roof on my store at 181 Main St., in this city, was laid in the year 1856. A paper and gravel roof was first put on, and this gave out after only three years' use.

"In the year 1876 we added 55 ft. to the building, which is 30 ft. wide, and this addition was covered with the same brand. The whole bids fair to withstand the elements fifty years more."





**7. DURABILITY:** The Ridgway Library building at Broad and Carpenter Streets, Philadelphia, was roofed with good tin in 1875 by William Obdyke & Sons. This roof has proved entirely satisfactory, and remains in good condition.

In March, 1904, our Syracuse representative reported:

"Ex-Governor Smith, of Vermont, covered his residence at St. Albans, with our tin in 1860, and this roof remains in splendid condition to-day.  
"Every schoolhouse in Syracuse built during the past fifteen years is covered with our tin."

The cashier of the Crawford County Bank at Van Buren, Ark., wrote us June 1, 1909:

"We are not contemplating the erection of another bank building. The one we now occupy was built twenty years ago, and covered with your tin. We understood then it was the best, and never changed our minds."

E. S. Colwell, of Warwick, N. Y., reported to us on Sept 6, 1909:

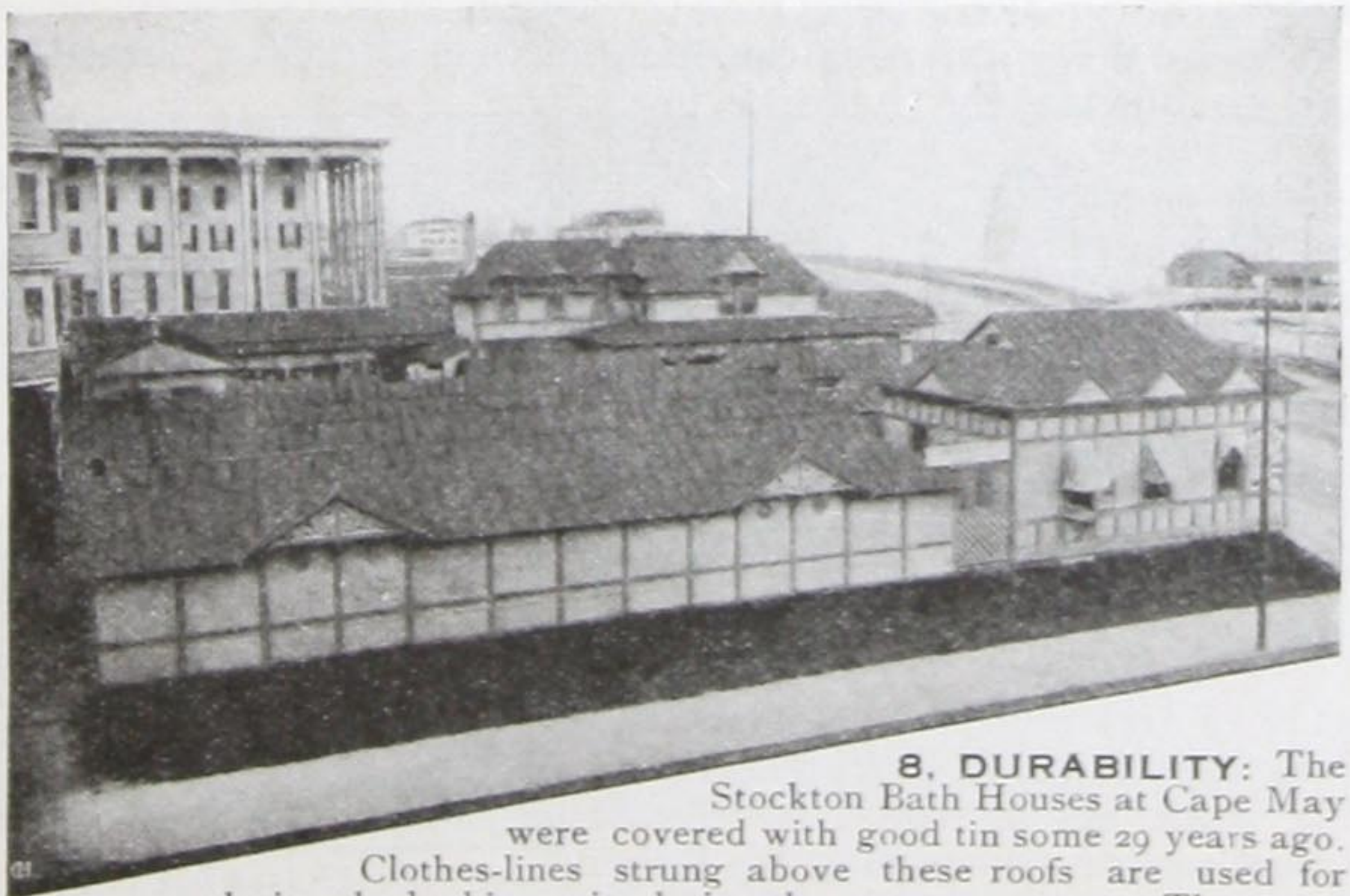
"In overhauling some papers, I came across a memorandum of a tin roof on a dwelling belonging to James Terhune, at West Milford, N. J., that was put on in 1858 by Reuben Randolph. Also a tin roof on a dwelling belonging to Peter Mead at Butler, N. J., put on in 1848, *sixty-one years ago*; and these roofs are still in good shape.

F. S. Merwin, roofer, of Pawling, N. Y., wrote us December 10, 1908:

"When I was learning my trade we put on a roof or several of them, which was some 58 or 60 years ago, and for aught I know, they are in good condition yet. I was then told that roofs put on with your tin would last 100 years."

Joseph Dozier, roofer, of Colorado Springs, Colo., used our tin for the Cutler Academy building in that city thirty years ago, and it remains in first-rate condition to-day, having required no repairs.

The old State Bank Building, in Indianapolis, Ind., erected about 75 years ago, has a tin roof that is said to be the same one originally put on.



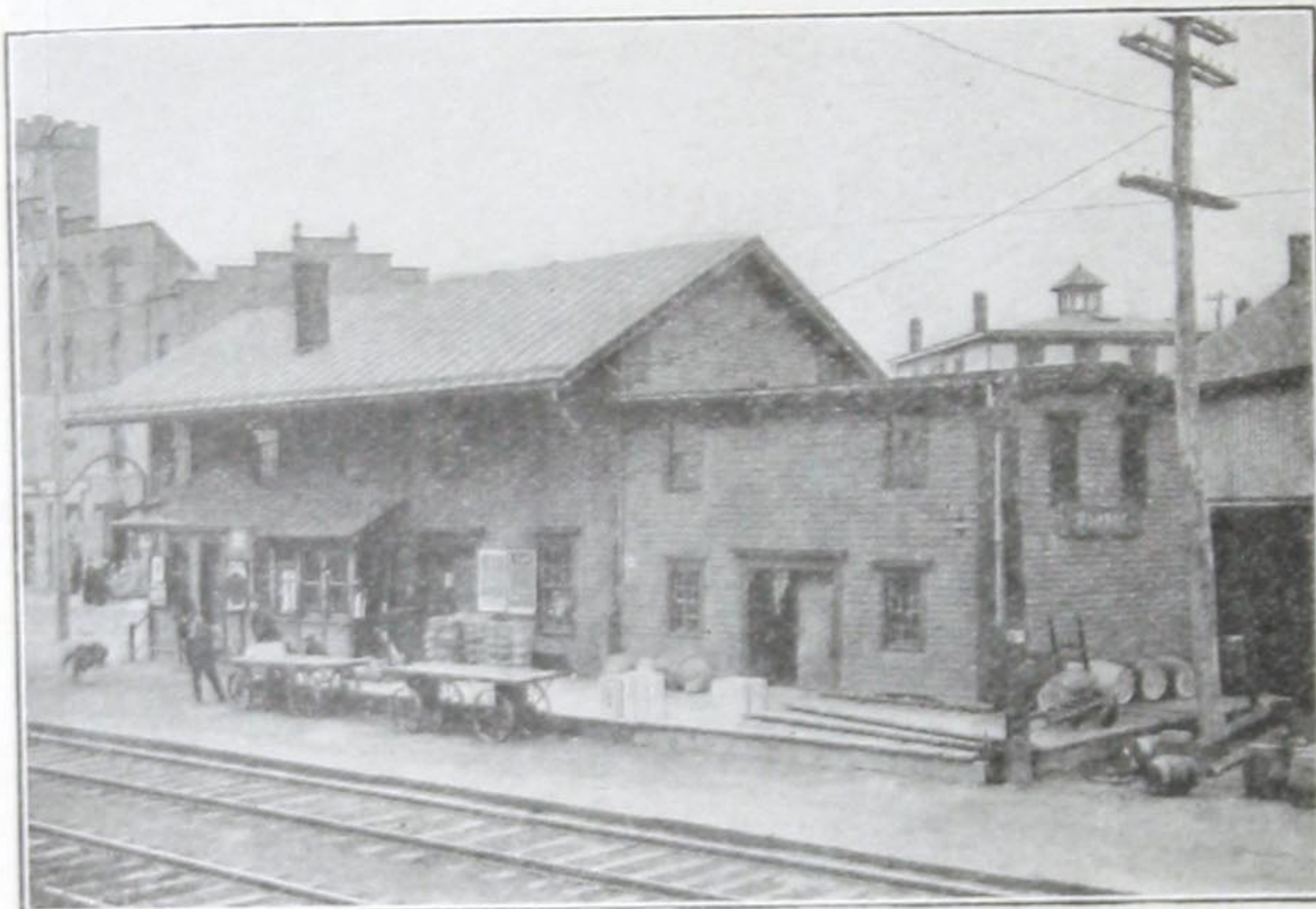
**8. DURABILITY:** The Stockton Bath Houses at Cape May were covered with good tin some 29 years ago. Clothes-lines strung above these roofs are used for drying the bathing suits during the summer season. The water from the suits drips upon the tin. In addition to this, the buildings are located directly upon the beach, within a stone's throw of the surf. These roofs have given entirely satisfactory service, and remain in excellent condition to-day.



Mr. Joseph Gardner, one of the oldest roofers in Indianapolis, states that the old roof was still on the building in 1861, and it has not been changed since that date.

In Mauston, Wis., a store building erected in 1875 by Nelson Heal, was roofed with our tin. Some changes were made in 1907 which necessitated cutting through the roof, and the tin was found to be in perfect condition. The building is now owned by Mr. Andrew Ely.

Adjoining this building is another, erected by Mr. Ely in 1886, also roofed with our tin, in perfect condition to-day.



**9. DURABILITY:** This old station, on the line of the Erie Railroad at Monroe, N. Y., was roofed in 1847—63 years ago—with good tin. This roof stands to-day as a testimonial to the value of good tin roofing—unchanged by the wear and tear it has undergone, and apparently as good as when first put on the building.

E. N. Hughson, the veteran sheet metal worker of Clyde, N. Y., reported to us in September, 1910, that he roofed the Langdon residence in that town with our tin in 1858, and the owner reports that the roof is as good as ever.

Abbott & Son, the largest hardware dealers in Marshalltown, Iowa, bought from us in 1863 the tin for covering their store building. That roof has always given entire satisfaction, and is in good condition to-day.

*For additional proof, see illustrations Nos. 1, 2, 3, 4, 5, 7, 15, 19, 20, 21, 30, 32, 37, 41, 42, 53.*

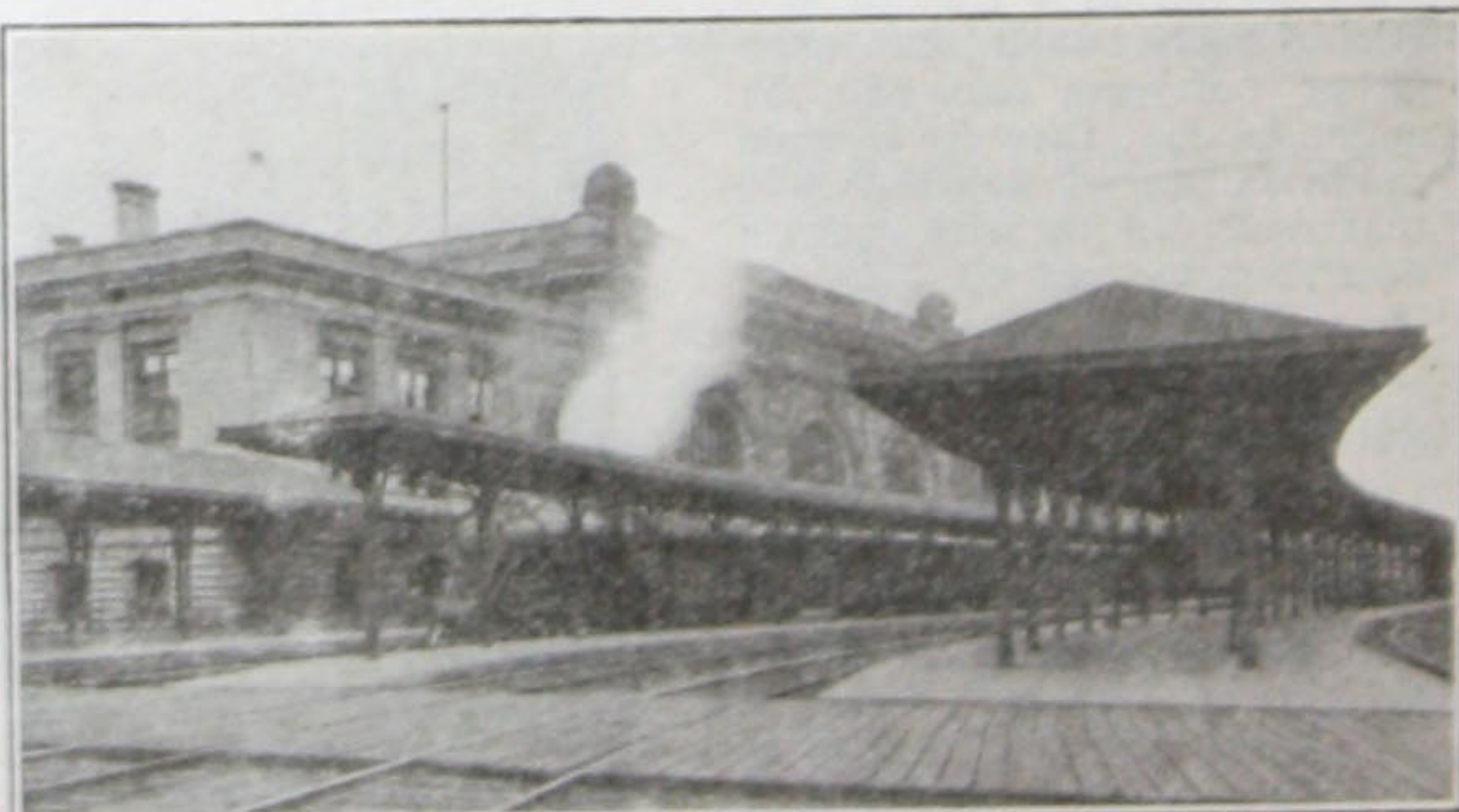
The durability of heavily coated, hand-made tin is not a matter of climate or locality. Many of the old roofs on our records are located along the Atlantic Seaboard. Cheap tin will give out as soon along the seacoast as anywhere else, but the old-time hand-made article has always given satisfactory results in the pure air of this region. Our best tin is constantly being used for roofing the buildings of the United States Life Saving Service and Coast Defence.

Our tin has been used by the Florida East Coast Hotel Co. for roofing its extensive system of hotels, giving excellent satisfaction.

At Newburyport, Mass., is a house the rear portion of which is roofed with our tin put on in 1863. The owner reports that this roof is in first-class condition and has never leaked a drop. The tin upon this section of the building has outlasted three shingle roofs in the main part, and bids fair to outlast the building itself.

Another case is reported from Stamford, Conn., by William W. Gillespie, of 149 Washington Avenue. His residence was roofed in 1871 with our tin, and in 1906 the owner states that the tin is "as sound to-day as it was when first put on."

Note the testimony of a roofing contractor who has had a long experience in sheet metal roofing work among the New Jersey Coast resorts (succeeding his father in the same business). Mr. I. R. Taylor, of I. R. Taylor & Co., Inc., Asbury Park, N. J., writes us December 31, 1910:



**10. DURABILITY:** The main building, platform sheds, etc., at Albany, N. Y., on the line of the N. Y. C. & H. R. R.R., were roofed with our tin in 1902. The chief engineer reports these roofs in first-rate condition after eight years' wear. This is mentioned merely as one of the innumerable cases that serve to show the durability of good tin roofs put on in recent years.

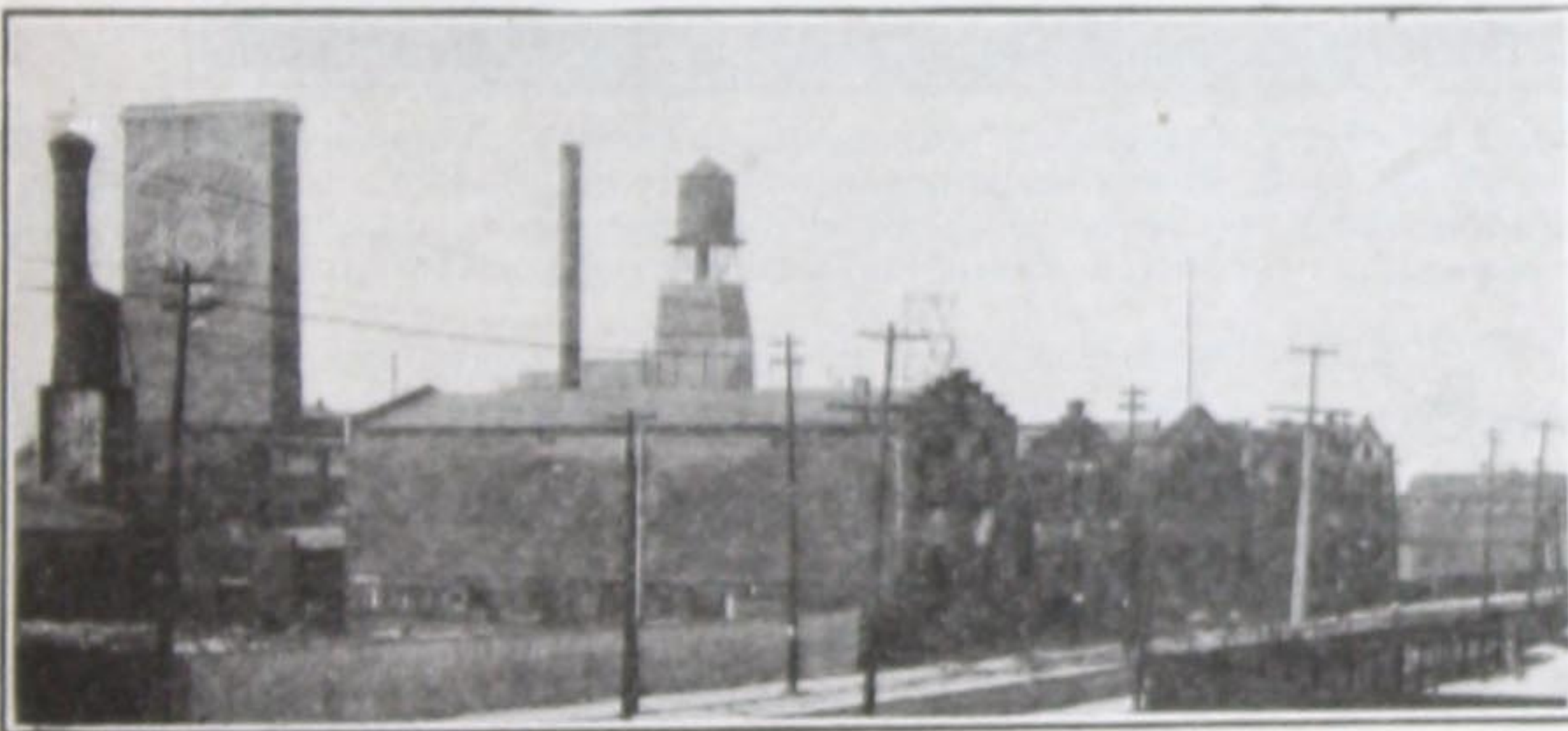


"Replying to yours of the 29th, in regard to the use of tin along the Atlantic Seacoast, and the effect of the salt atmosphere upon it—differing from the atmospheric effect in other localities—we beg to say: in all our varied experience as general contractors and builders in this locality we have failed to note any deterioration whatever in our metal work where your tin was properly used; and we know of no special precautions necessary except that the tin should be thoroughly painted on the underside before laying. It should be carefully protected against damage during application and painted immediately after laying.

"With this amount of care we are positive where tin is built in it will outlast the enclosure; and where exposed, if kept properly protected with paint, it should last a century."

*For additional proof, see illustrations Nos. 6, 8, 50, 55.*

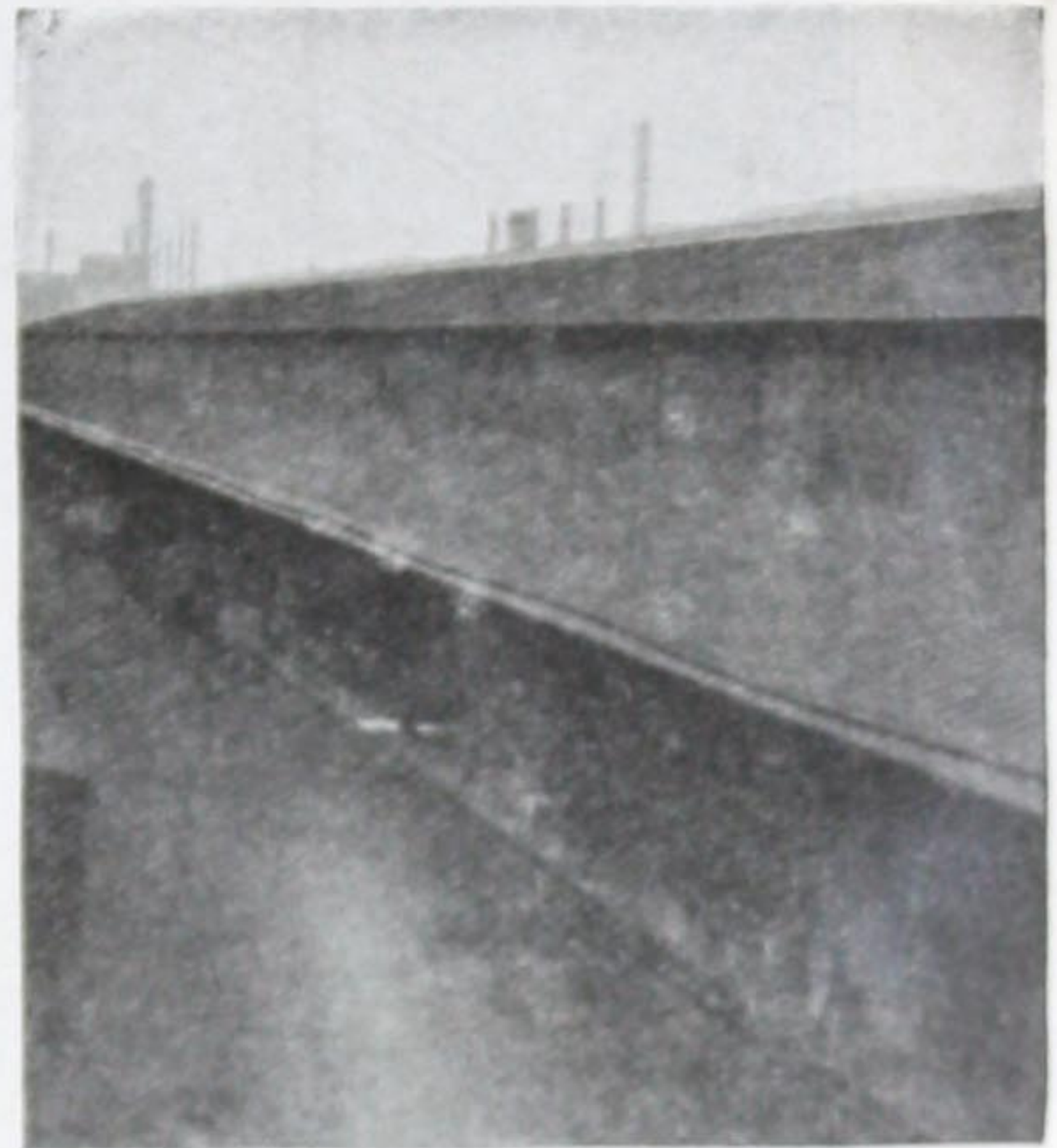
The durability of good roofing tin has been found amply sufficient to withstand the severe conditions of service on buildings connected with our prominent railroads; in fact, our best tin is peculiarly well adapted for work of this kind, for its remarkable durability, complete protection against fire from flying sparks, and its neat, handsome appearance.



**12. DURABILITY:** Since 1887 to the present day our tin has been the standard for all roofing work on the permanent buildings of the Chicago Varnish Company. Additions were made in 1888, 1892, 1895, 1899, 1900, 1903, and 1905, requiring 22,500 sq. ft. of our roofing tin. The architects in charge of the construction work at this plant are enthusiastic over the satisfactory results secured from the use of this tin, and report that all the roofs are in excellent condition, although located in the midst of the manufacturing district and exposed to smoke from the numerous stacks and from locomotives constantly passing.

was roofed with good tin prior to 1840. This roof remained in good condition for more than sixty years. A sample cut from the roof and sent to us in 1901 shows it to be heavily coated terne plate, evidently in first-rate condition.

Large quantities of our tin have been used from time to time for covering the platform-sheds, stations, etc., of the Pennsylvania Railroad. These roofs have given good satisfaction, and are the standard type of roofing used for this class of work. The only attention needed is



**11. DURABILITY:** Freight station, C. B. & Q. Railroad, St. Louis, Mo. Covered with our tin in 1890. Five railroad tracks enter this building, and the roof is exposed constantly to the smoke of locomotives. The tin is laid with standing seams, on narrow tongued and grooved sheathing-boards. Roof in first-class condition, and apparently good for many years to come.

During Centennial Year—1876—a long coal-shed was built directly adjoining the Pennsylvania Railroad tracks in Philadelphia, and covered with a semicircular roof of good tin. This roof is still in first-class condition today, although constantly exposed to the smoke and gases of passing locomotives of numerous freight and passenger trains.

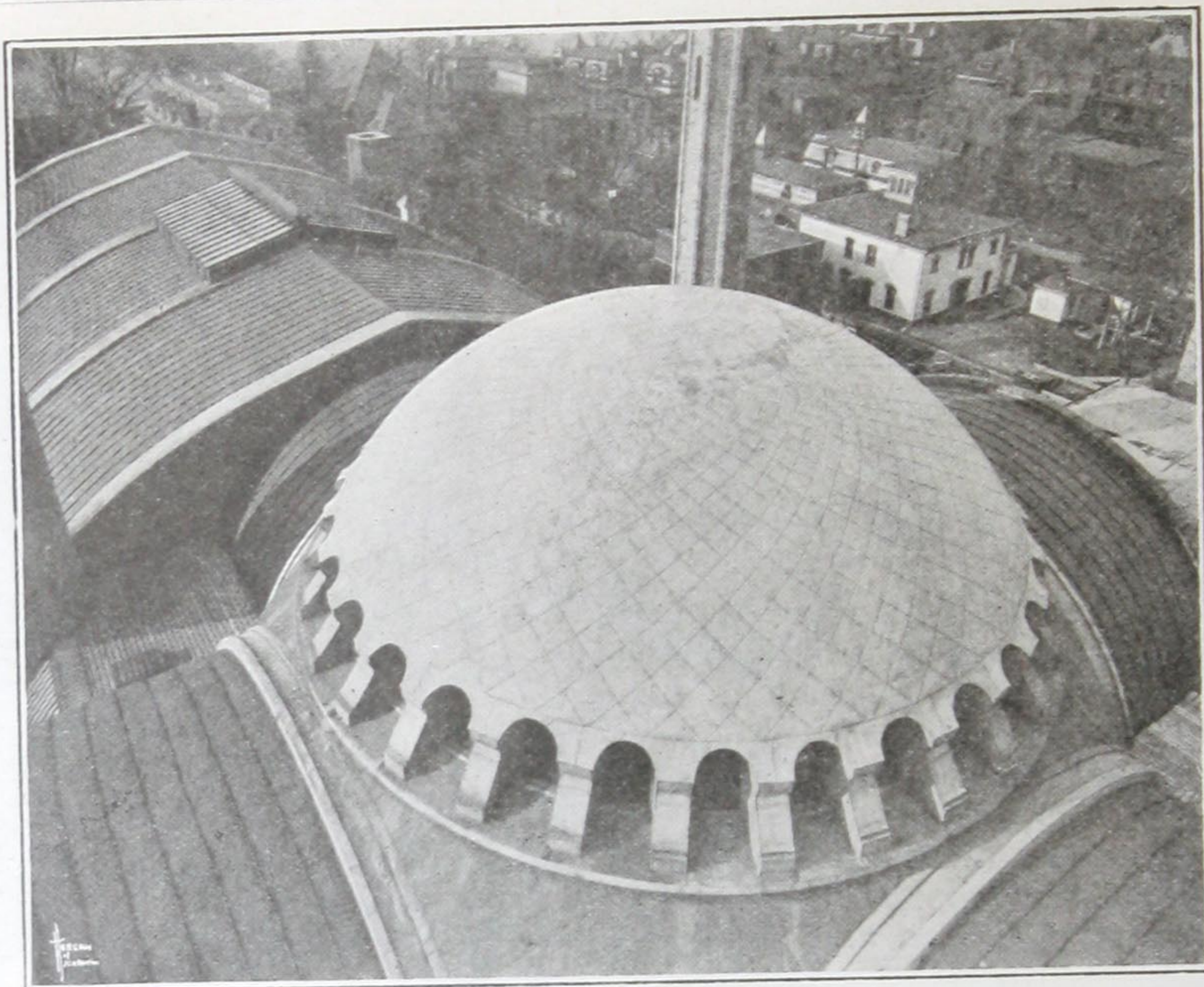
An old building at Chester, N. Y., located close beside the tracks of the Erie Railroad, has a tin roof in good condition after 68 years' service.

The machine shop of the Georgia Railroad, at Augusta, Ga.,



**13. DURABILITY:** Paper pulp mill at Harper's Ferry, W. Va. Situated within a stone's throw of the ruins of the historic John Brown's Fort. Between 1889 and 1907 three ordinary roofs proved their inability to stand the warm steam atmosphere beneath them and the wear and tear from sweeping accumulated sawdust from their surfaces. In the latter year a Target and Arrow roof was put on, and after thirteen years remains in first-rate condition, evidently good for many years to come. This building is directly alongside the main line of the Baltimore & Ohio Railroad, with passenger and freight trains constantly passing it.





**14. ADAPTABILITY:** This view shows the Irem Temple at Wilkes-Barre, Penna. This dome and all surrounding roofs of the building are covered with 15,000 sq. ft. of our best tin, put on in the fall of 1909. In covering the dome the sheets were cut square, decreasing in size from bottom to top. By using good tin a large item of expense was saved, which would otherwise have been required for a concrete dome, and a far more satisfactory roof was secured.

to clean the gutters of cinders, and to give the roof a coat of good paint every three or four years.

*For additional proof, see illustrations Nos. 9, 10, 11, 50, 55, 56.*

For the same reasons good roofing tin is without an equal for roofing permanent factory buildings where the nature of the business renders high-grade, lasting material desirable. A good tin roof on a business building indicates that the owners have faith in the stability of the enterprise, and see the wisdom of providing a first-class, durable roof—one that will prove a good investment as time goes on, rather than a source of trouble and expense.

*See illustrations Nos. 12, 13, 32, 45.*

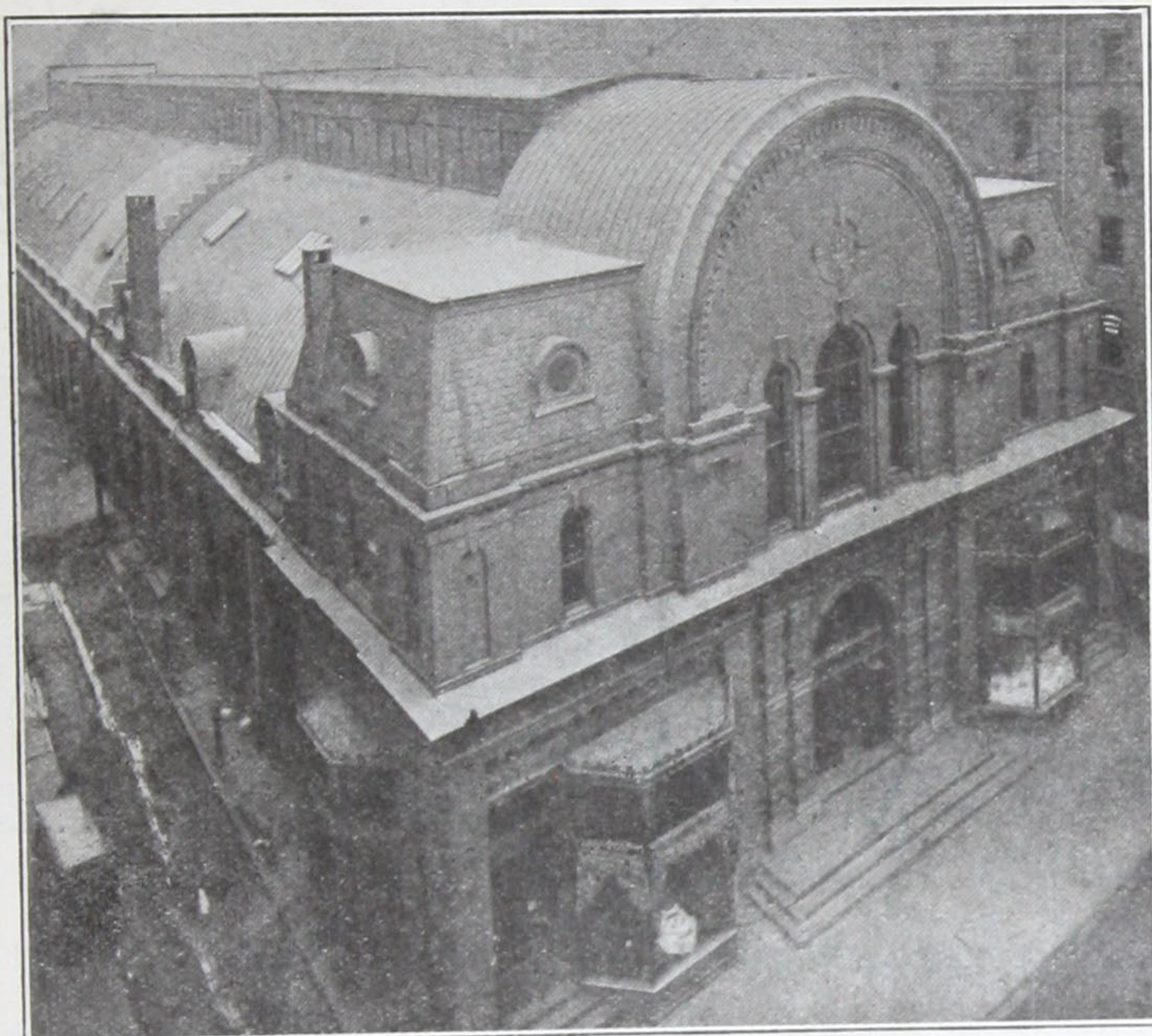
Many of the buildings at our works at Philadelphia, and at Cumberland, Maryland, are roofed with our tin. These roofs are exposed constantly to the smoke from our power houses, from our 25 tinning-stacks, and from our furnaces and rolling mills, as well as the acid fumes from our pickling departments. Under these adverse conditions the roofs have stood up satisfactorily, and are in practically as good condition as when first put on.

## 2. A TIME-TRIED, ESTABLISHED ARTICLE.

This is one of your strongest points in talking tin roofing, as no other roofing material in common use to-day has had so long a test of use. The only sure test of a building material is the test of time, yet extravagant claims are often made for cheap, makeshift roofings, about which very little is known from actual experience.

Tin plate of various kinds has been used for roofing purposes in this country for more than one hundred years. There have naturally been improvements in the product in that length of time, and there has also been a great increase in the number





**15. ADAPTABILITY:** The Mercantile Library, on South Tenth Street, Philadelphia, is covered with the original tin roof put on when the building was erected, between 1850 and 1860. This roof has proved entirely satisfactory in every way, and serves as a good illustration of the use of tin roofing on curved and irregular surfaces.

of grades available; so that while in former years the roofing tin sold was of very few grades, and all of these good, nowadays you are offered cheap, machine-made material that is utterly worthless for roofing purposes. The better grades are still to be had, however, and you can furnish a property owner with the same durable quality of roofing tin that has been supplied to the American sheet-metal roofing trade for sixty years or more. The reputation of this tin, and its long record of service, are a guarantee in themselves, but if the buyer asks for a definite guarantee you need have no hesitation in giving it, and the manufacturer will back you up.

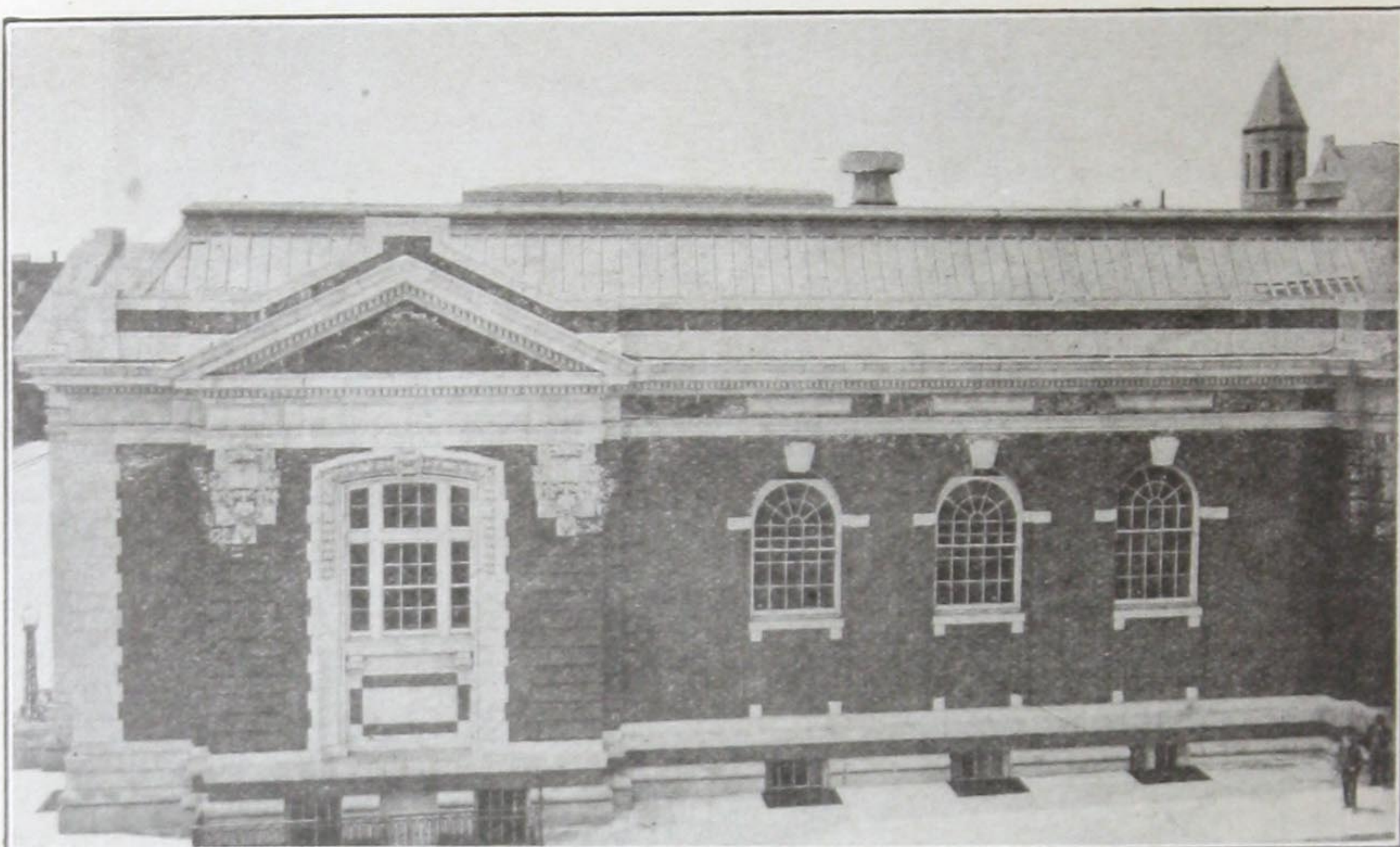
A complaint of good roofing tin is a rarity, and can usually be traced to some neglect or misuse of the material. It is difficult for the mind to grasp the idea of the hundreds of thousands of roofs of our best tin that have been put on in all parts of this country during the past 75 years or more. The steady demand for this article, and the repeat orders from our old friends in the trade, are sure indications that the tin gives universal satisfaction, and you can safely recommend it to any one who has a roofing problem to solve.

The roofs of the buildings around the Eckert Furnaces at Reading, Pa., gave trouble from the gases and sulphur fumes. Several kinds of patent roofing were tried, including slag and gravel, but all failed. Finally, roofs of our tin were put on over matched sheathing boards, insulated with waterproof paper and well painted on both sides. These roofs gave perfect service for more than twenty years, and would doubtless have lasted for many years to come had not the buildings been torn down.

### 3. EASILY APPLIED.

Applying the tin to the roof presents no serious difficulties. The proper methods are outlined in the "Tin Roofer's Handbook," issued by the National Association of Sheet Metal Contractors for the use of roofers and their apprentices. If you need a copy of this book for your files, write us and we shall send it without charge.





16. ADAPTABILITY: The Carnegie Library, at Frankford, Philadelphia. In this case the tin has been laid over half-round strips to give the desired ribbed effect.

#### 4. ADAPTABLE TO ANY SURFACE.

Good roofing tin is tough and ductile, and is used successfully for covering any surface from a flat deck to a vertical wall. Where curved or irregular surfaces are to be covered the metal is easily shaped to conform to them.

*See illustrations Nos. 1, 14, 15, 16, 17, 18, 59.*

#### 5. MODERATE FIRST COST.

The important thing to bear in mind in considering the first cost of a roof of good tin is that at this price you furnish a *permanent* roof. A high grade roof of this kind is obviously not to be compared to the cheap makeshift roofings widely advertised nowadays, for which many extravagant claims are made that are not borne out in service.

A well laid roof of durable tin, costing 10 cents per sq. ft., is a better proposition for covering any good substantial building, than a tar-and-gravel roof, for instance, costing five or six cents per sq. ft., made of perishable, inflammable materials, that have a limited life at best.

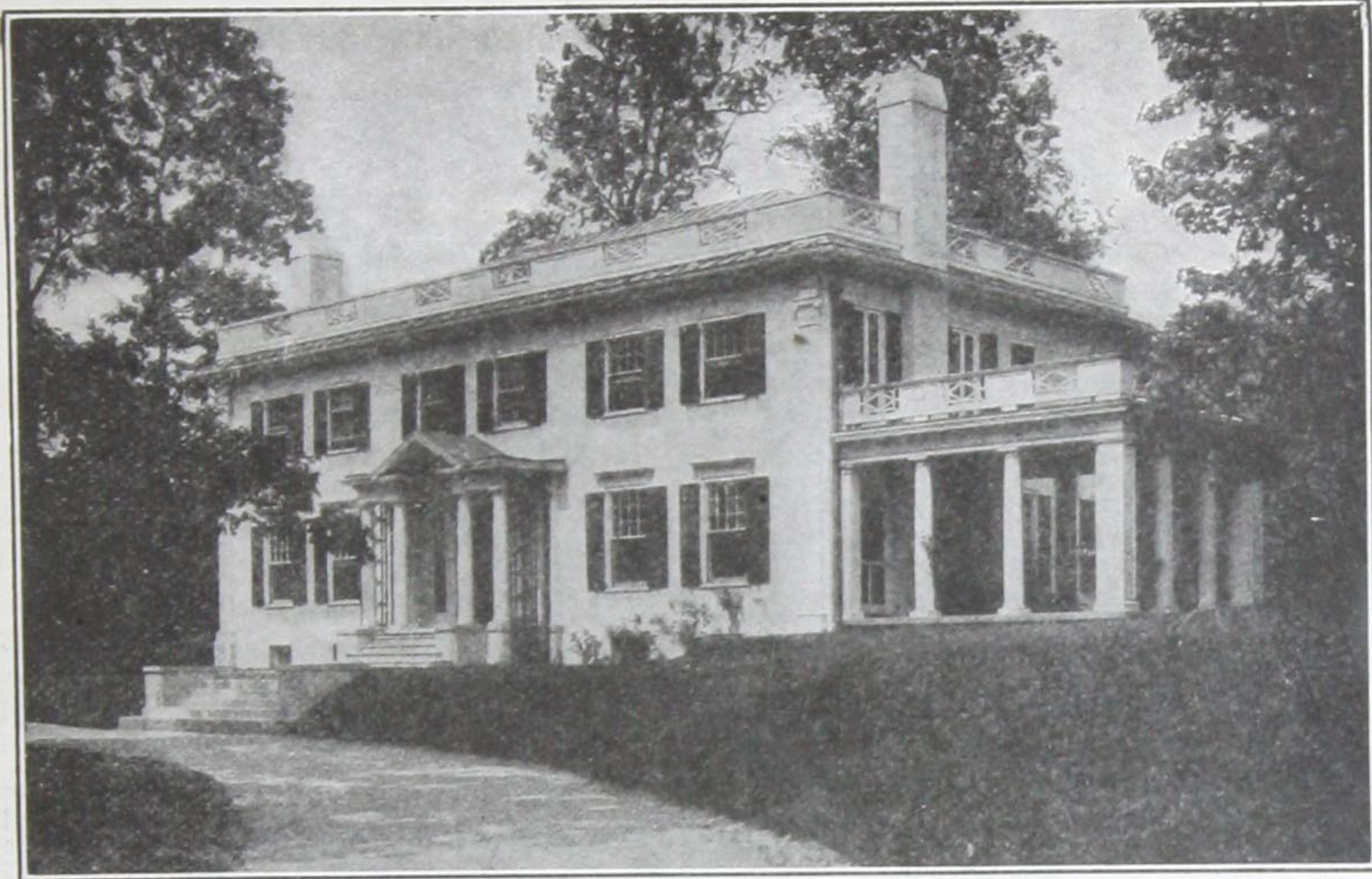
Such materials as tar, pitch, asphalt, etc., when exposed in a thin sheet spread on the roof to the baking heat of summer and the cold of winter, soon lose their waterproof quality and shrink and crack, as the action of the weather dries out the gums and oils. There is a great difference in the use of tar and pitch for this purpose, and for waterproofing underground structures. In one case there is severe exposure to the weather, with wide variations of temperature of 100 degrees or more. In the other case the conditions and temperature vary little from season to season.

These facts should be submitted to the property owner. It should not be difficult for any roofer to show clearly that composition and patent roofings are naturally cheap because of their inferiority.

#### 6. LOW COST OF MAINTENANCE.

Experience has shown that a well laid tin roof can be expected to last as long as the building stands. That is the record of thousands of roofs of good tin in all parts of the United States, and illustrations are constantly brought to our notice. To keep a tin roof in good condition it is only necessary to see that it is given a coat





**17. ADAPTABILITY:** H. W. Blake's residence, Englewood, N. J. Illustrating the artistic use of good tin on a suburban residence. Note the neat appearance of the standing-seam tin roofing.

of paint from time to time, at longer intervals as the roof ages and the paint-skin thickens. We know of many roofs more than 30 years old that do not require painting more than once every six or eight years. It is important that the first two coats of paint be of good quality and properly applied. After that the subsequent coats are necessary only to repair the wear and tear of the weather, accidental scratches, and the natural deterioration of the paint film. The cost of painting can be reckoned at close to one-half a cent per sq. ft. This small cost represents only the reasonable attention that a good article deserves. Instructions for painting tin roofs are given in the "Tin Roofer's Handbook." The approved paints for use on tin roofs are red lead, red oxide, metallic brown or Venetian red paint, with pure linseed oil. Graphite, and paints containing bituminous substances, should never be used on tin roofs.

The Harrington Block, of Portland, Ore., was covered with our tin in 1884, and has required no repairs whatever since the day it was laid. Its present condition indicates that it will stand as evidence of the durability of good tin for many years to come.

The building occupied by the firm of Wallace Bros. Co., of Lafayette, Ind., was roofed with our tin in 1871. With the exception of a few coats of paint, this roof has required no attention whatever during its 35 years of service, and is in good condition to-day.

Mr. Allan Forman, No. 41 Liberty St., New York City, reported to us on October 10, 1906:

"I have inherited the old home at Mattituck, Long Island, the tin roof of which was furnished in 1862. With the exception of a small spot which was damaged by careless bricklayers while repairing the chimney, the roof has never cost a penny for repairs, and to all appearances is good for fifty years more."

In December, 1905, R. O. Rosen, architect, of Decatur, Ill., reported:

"The tin on the Bachrach Building has weathered the storms for 25 years without deterioration. It has been painted but once with ordinary paint."

"The roof of the John Ulrich building has the same record for twelve years. The roofs were put on so long ago that the name of the roofer who did the work is past our memory. No repairs of any kind have been necessary on either of these roofs, which we understand is the general record of your tin."

George A. Kemper, roofer, of Akron, Penna., reported in October, 1905:

"In 1848 my father roofed a church steeple with tin. Forty years afterward, the wood-





**18. ADAPTABILITY:** Fremont County Court House, St. Anthony, Idaho. Dome, steps, cornice, and surrounding roofs covered with good tin. Sheets laid horizontally, with perpendicular joints broken. Sheets cut slightly tapered, fitting closely to the curve of the roof.

work becoming unsafe, it was replaced by a new one. I took the tin off the old—it was still very good—and I believe that it would have lasted another forty years.

“I have in mind a tin roof that I put on 44 years ago, which is still good. Nothing was done to it in all this time, except several coats of paint were put on.

“Last year I took off a felt, tar paper, or composition roof of some kind that was entirely rotted out in five years, and put a tin roof on. I believe that tin is the only material that is worth putting on any roof, because it will last.”

In “The Metal Worker,” of New York City, for October 7, 1905, we find the following:

C. Flickinger, 408-410 W. 18th St., Erie, Penna., a roofer of forty years' standing, says: “I have put on tin roofs in 1867 in this city that have not cost the owner a dollar outside of the cost of painting. One of my old customers told me the other day of a roof I put on 37 years ago. He never paid a cent for repairs.”

## 7. RE-USE, SECOND-HAND VALUE.

If a building roofed with good tin is torn down, the tin still has value, and can either be sold for a fair price or used again on the new building.

In making extensive alterations to a building in the business section of Lynchburg, Va., the roof of our tin covering it was found to be in perfect condition. Accordingly, the roof was propped up and the new structure built under it.

Another instance of this kind is that of a building in Franklin, Penna., which was covered with our roofing tin ten years ago. The building was recently torn down, but the tin was found to be in such good condition that it was carefully rolled up and set aside, and later used on the new building.

Messrs. Sparger & Peters, architects, of Bonham, Texas, sent us on January 14, 1910, a sample of our tin taken from a roof that was being removed to put up a new building. They say:

“This roof has been in place 52 years. It has never had a tinner on it that any one knows of, for repairs, until about six months ago, when a part of the roof blew off in a storm, caused by the rotting away of part of the old wood cornice, allowing the wind to get under the roof. The old tin from this roof was sold at once for two dollars per square, to be used as a cover for cowsheds. We were very much surprised to find the old roof in such a remarkable state of preservation, all of which is as good as the sample sent you. The new roof is to have the same brand of tin.”





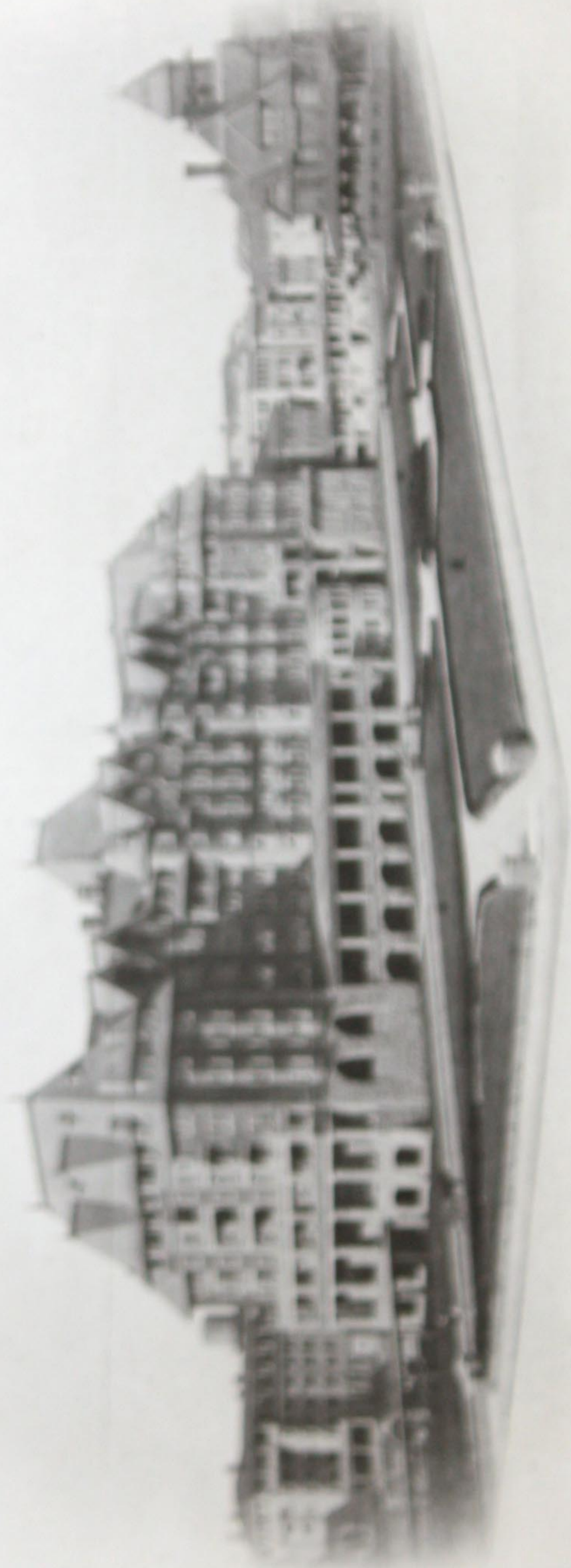
STATE ARMORY, MEDINA, N. Y.

Roofed with 10,000 square feet Target-and-Arrow tin. A good example of the use of tin to cover a large expanse of roof.

*Geo. L. Heins, Architect, Albany, N. Y.*

*Curtis & Wilson, Roofers, Medina, N. Y.*

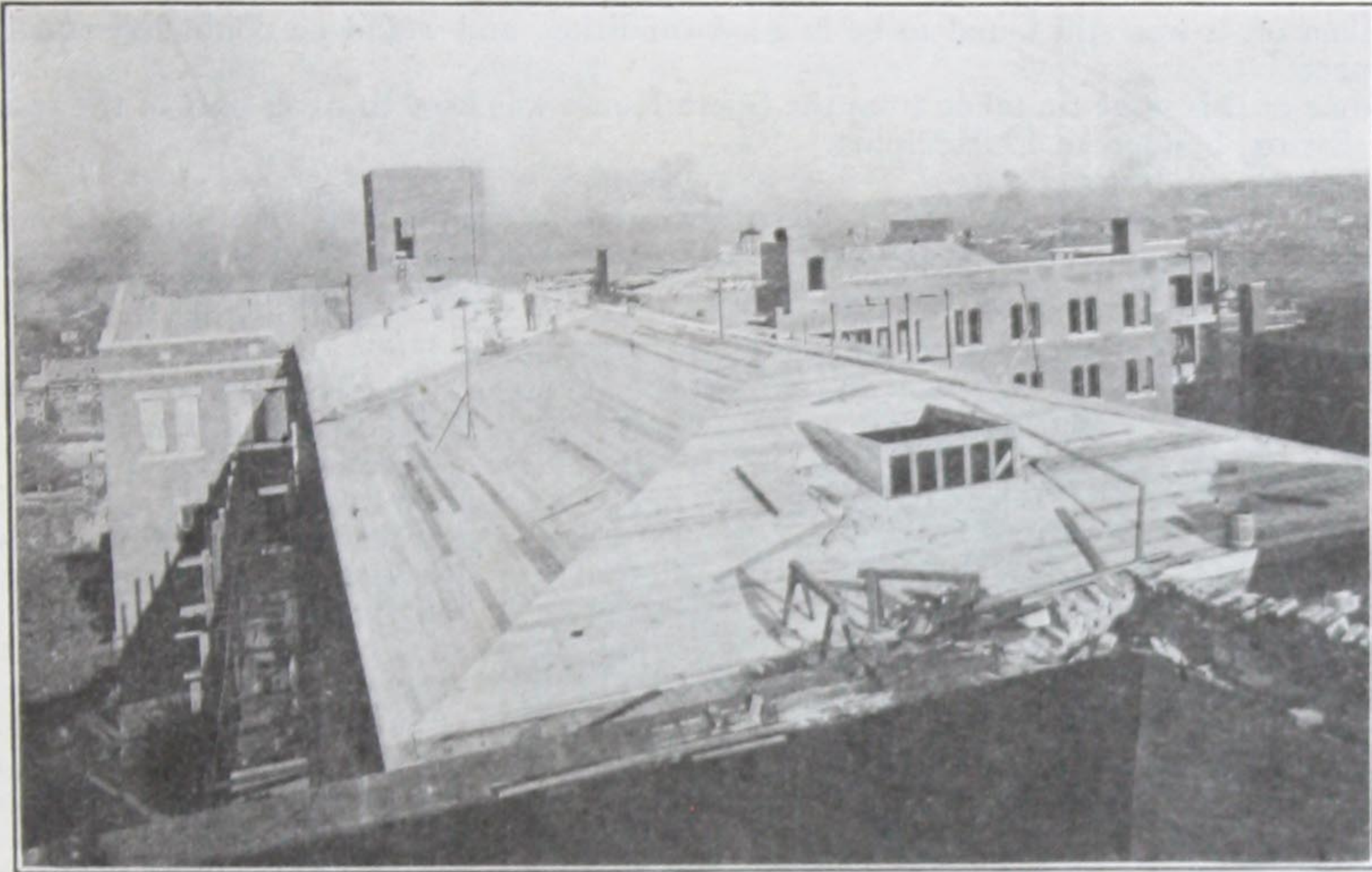




HOTEL MARLBOROUGH, ATLANTIC CITY, N. J.

Visitors to Atlantic City will recognize this structure—the Hotel Marlborough, one of the largest at this well-known summer resort. Our Tapered and Arrow Six was especially well used on the roof of this building. Numerous other hotels, residences, business blocks, etc., in Atlantic City, are protected with roofs of this six.





**19. RE-USE, OR SECOND-HAND VALUE:** In making improvements to St. Margaret's Hospital at Kansas City, Mo., it was necessary to remove a considerable portion of the old roof of our tin put on in 1884. The tin was found to be in perfect condition, and met ready sale at \$8.00 per square *for use on other buildings*. The same make of tin was used entirely for a new addition to the building.

The high school building at Carthage, Mo., which was torn down in 1905 to make room for a more modern structure, was erected in 1870. When the old roof of our tin was taken off it was found to be in good condition, and nearly as bright on the under side as when it was put on. It found ready sale at \$2.00 per square in the roll. The Board of Education, profiting by this experience, ordered the same grade of tin to be put on the new, one hundred thousand dollar high school building.

J. H. Patt, roofer, of Creston, Iowa, reported May 14, 1909:

"Last year I sent my man to measure roofs and get out 150 ft. long by 28 in. wide gutter that I put on 35 years ago, as the building was to be re-shingled, thinking the tin would also want renewing. The tinner took it out without reporting its condition. One corner was rusted where the limb of a tree was allowed to lay on the roof. The balance was good for forty years more."

Several years ago August Gossel, a St. Louis sheet metal worker, since deceased, took off an old roof of our tin that had given good service for 35 to 40 years, and used this old tin on one of his own properties, as it was found to be in excellent condition.

G. W. Foote, architect, of Atlanta, Ga., wrote us in October, 1908:

"I recently repaired a roof of a dwelling near this city, which had the valleys laid with your tin. This house was built 'befo' de wa', as a 'colored gemon' expressed it. The valleys were in good condition, and the under side was as bright as new. I used them again in the changed roof, and they seem good for many years' service yet."

W. N. Brown, architect, Martins Ferry, Ohio, wrote us February 11, 1908:

"The most convincing fact that has come to me in regard to your tin being the best on the market is, a few days ago I was remodelling an old house that has stood for a great many years, and found that the roof was of your old brand, and in such good a state that it was used again on the porches, although a part of it remains on the main house yet."

"The tinner informed me that the new tin he was working—your leading brand—was in all appearance the same quality as the older roofing."

"While I have only been in the business about three years, I find I can get better satisfaction and better results from your tin, and shall continue to specify the same in all cases I can."

John C. Arnold, a roofer of Germantown, Penna., sends us a sample of our tin that had been taken from the Norristown Opera House after 20 years' service. The building was burned and a considerable quantity of the tin was removed from a back building that was not destroyed. This tin was used for roofing a pigeon coop, and remained there without any attention for five years.



When taken off it was still found to be in good condition, and would no doubt have lasted many years longer.

Some of this same tin taken from the Opera House was used to cover part of the residence of Burd P. Evans, builder, of Philadelphia.

T. B. Dornan-Adams Co., of Lynchburg, Va., sent us a sample of terne plate which had been on the building for a period of 49 years. The building covered by this tin had to be torn down to make way for a grain elevator, and the tin was removed, trimmed, and used again on four small houses.



**20. RE-USE, OR SECOND-HAND VALUE:** The Tremont Hotel, at Houston, Texas, was remodeled in 1903. The original building was covered with our tin, put on in 1873. When the old building was torn down the tin roof was found in such perfect condition that it was carefully taken off and relaid on the new building. This tin remains in as good condition as it was 38 years ago.

The roof of the C. B. & Q. R.R. freight station at St. Louis was covered with 1125 squares of our tin some twenty years ago, by Santman & Clemens. There are at least five locomotives working around this building all the time, but it is in good condition to-day. In the year 1896 a portion of the roof was blown off in the cyclone, and replaced by the same brand. The tin blown off was put on a part of the roof of the shop and office of John Clemens, roofer, and is in as good condition, or nearly so, as when new.

Another interesting case of this kind is reported to us by Mr. H. Wood Breneman of the firm of Flinn & Breneman, roofers, of Lancaster, Pa. He writes:

"The tin referred to covered the entire back buildings of our old homestead, and was in use some 40 odd years. I do not remember its ever being repaired, and the only attention given it was the painting, which was done at intervals of five or six years apart—one coat of metallic brown and linseed oil carefully brushed on.

"When this building was torn down about four years ago the tin was found to be in good condition. A sample piece was shown me by one of the workmen, and I was told that the seams were carefully cut out and the tin used to cover several small buildings."

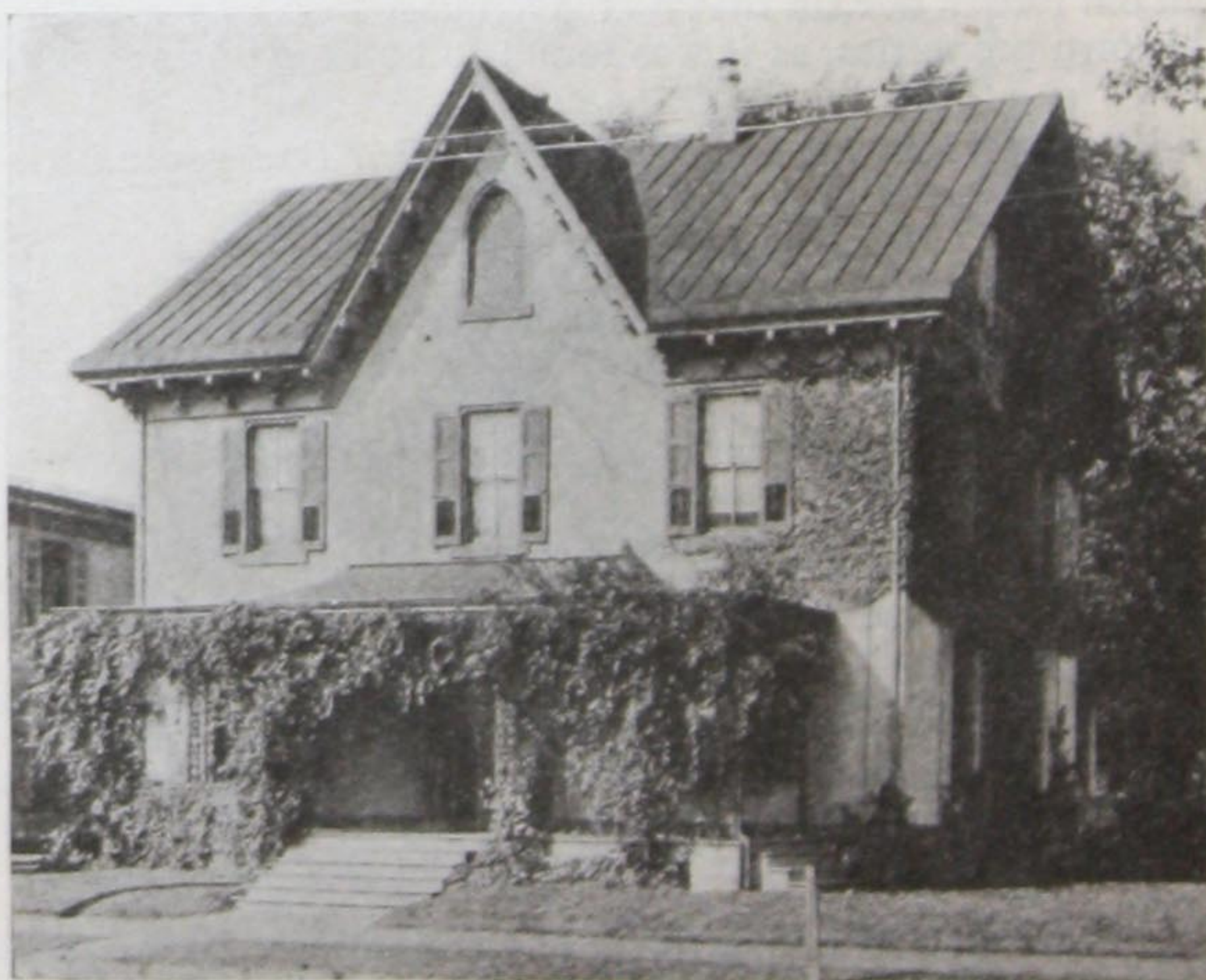
A roofer of Ashland, Pa., reported on January 20, 1909:

"I put on a roof in 1874 for a friend and gave it one coat that year. The following year I gave it the second coat and did not paint it for seven years after, and then five years after, when my friend died, and it did not get another coat. This year I took off the roof by cutting the tin at the standing seams, and found it still bright on the under side, so I trimmed it and put it on a porch roof and on a kitchen. It will stand 34 years more if they will paint it, say every five years, with good paint."

Dalton and Eveleigh, architects, of Vancouver, B. C., reported June 3, 1909:

"We recently pulled down a 2-story frame building with a flat roof, which we built about twenty years ago, to make room for a 6-story building. We found your tin to be in splendid condition—in fact, we think the roof would have outlasted the timber frame."

A roofing concern of Quincy, Ill., who used our tin 18 years ago



**21. APPEARANCE:** This old residence at Moorestown, N. J., was roofed with our tin in 1853—57 years ago. Age has had no effect upon the appearance or the value of this roof.



to cover their buildings, reported recently that they had taken this tin off a one-story building and would use it again after the building was raised to the height of the adjoining structure. They say:

"We think this a pretty good testimonial to your tin—to be able to use this tin, that we put on 18 years ago, over again on the new building."

The New York Store, at Indianapolis, Ind., built about fifteen years ago, was roofed with heavily coated, hand-made tin. Some seven or eight years ago another story was added to this large dry goods store, and the roof was taken off. The roofers, C. Off & Co., found the tin in such good condition that Mr. William Off used it over again on a barn of his own, where it is still doing good service.

After fifty years' service, a roof of our tin on a residence at Dennison, Ohio, was found to be in such good condition that it was not disturbed in the course of alterations to the building.

Francis J. Plym, an architect of Kansas City, Mo., reported on January 2, 1904:

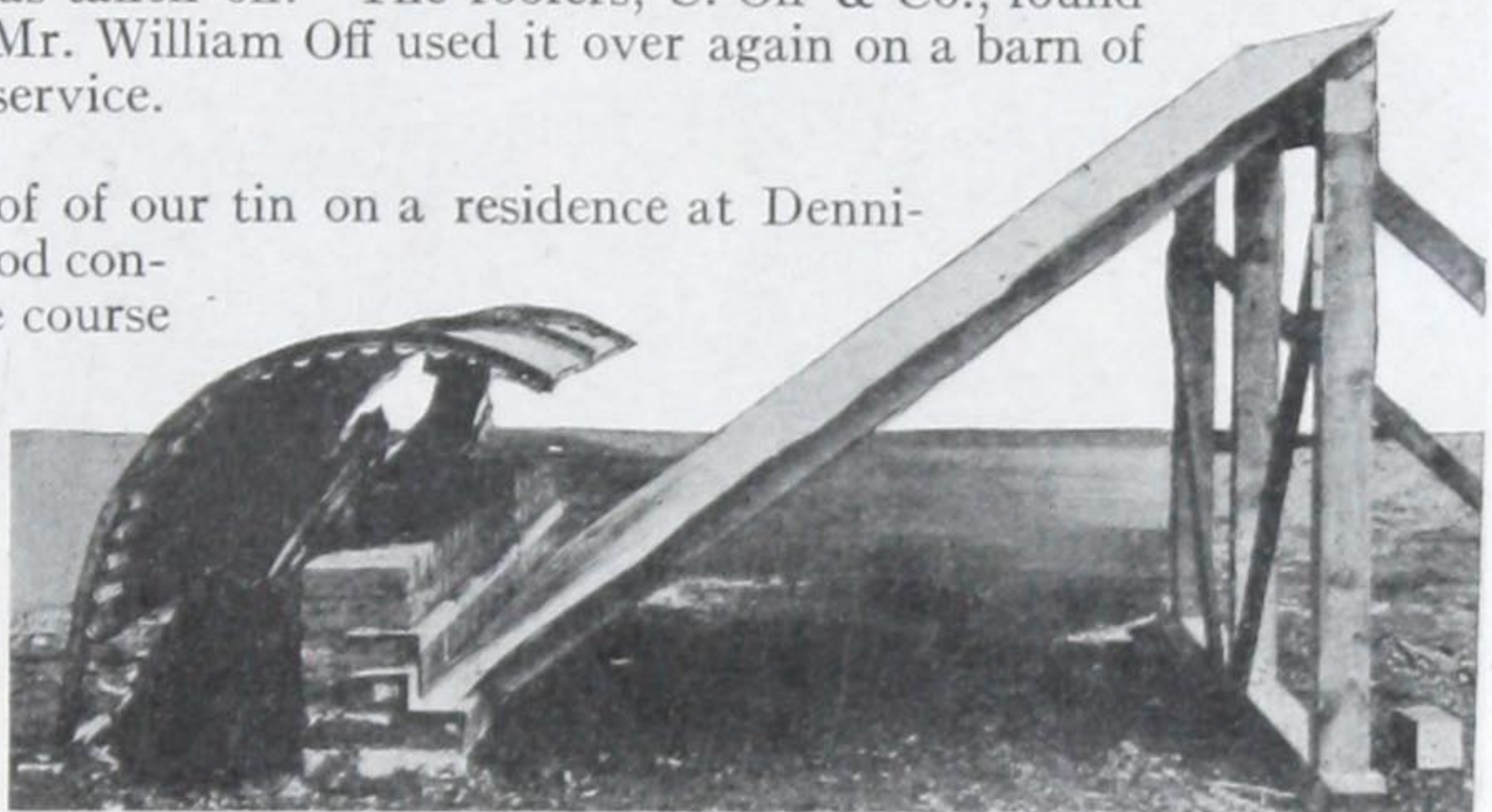
"Mr. Walter Van Stone, of this city, told me not long ago that he assisted in removing a roof of your tin that had been on 50 years. This was in 1869—34 years ago. After removing the tin it was discovered to be in such splendid condition that it was retrimmed and put on again, and, from what the relator told me, it is on yet. Roof was a standing seam. Mr. Van Stone, who told me, is a man whose veracity is beyond question."

*For additional proof, see illustrations Nos. 19, 20.*

Those who like to figure out the *cost per year of service* for a roof, will be surprised at the low cost where good tin is used. The first cost of the roof plus the cost of painting every four or five years, less the final value of the metal, after thirty or forty years of service, will show a yearly cost far below that of other roofing materials. Then, too, the element of satisfaction must be considered,—that the tin roof has given perfect protection to the building and has proved a good investment. Cheaper roofings are too often a source of trouble and expense during their short life.



**23. FIRE TEST OF TIN ON ASBESTOS SHEATHING-PAPER:** Showing a section of the roof cut open after the test. The sheathing-boards were found uninjured. The deadening-felt had crumbled under the heat, but the asbestos paper remained in perfect condition. The tin was blistered and discolored by the intense heat, but easily withstood the fire.



**22. FIRE TEST OF TIN LAID ON ASBESTOS SHEATHING-PAPER:** In this test the wood sheathing-boards had no protection except a single layer of asbestos sheathing-paper and a single layer of ordinary roofing felt, and over this good tin laid with flat seams. Although the flames carried by the deflector against the surface of the tin frequently reached beyond the upper edge of the roof, the sheathing-boards did not show the slightest evidence of charring or igniting.

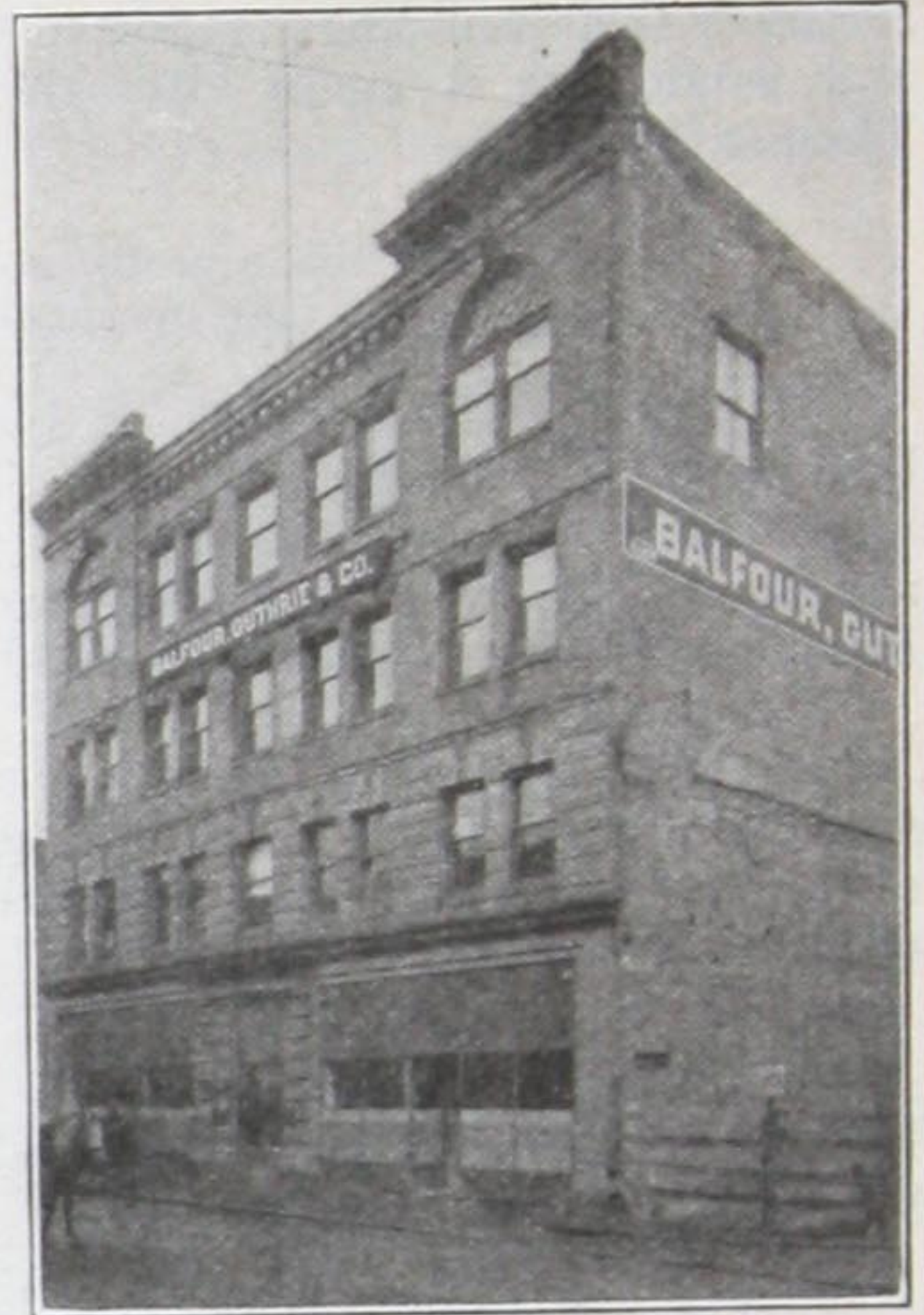
## 8. EASILY AND QUICKLY REPAIRED.

Any roofing is subject to accidental damage. In that event it is desirable to have a roof that can be repaired without delay, in any weather, to prevent serious damage to the interior of the building. Repairs to a tin roof are simple, and can be made at slight expense, without any wholesale tearing up of the roof, as in the case of built-up composition, where the water from a leak may run along between the courses of the tar-paper or felt for some distance, going through into the building at a point some distance away from the leak.





**24. PROTECTION AGAINST FIRE:** The Hunsberger warehouse building on North American Street, in Philadelphia, containing such combustibles as grain, hay, straw, etc., has had a severe test of exposure to fire. The adjoining building was burned twice in 1906. At both times the wind carried the flames against the warehouse roof, but the tin roofing successfully withstood the attack, and each time only a coat of paint and the soldering of a few seams were required to put it in good condition.



**25. PROTECTION AGAINST FIRE:** This illustration shows the Volkman Building, one of the few buildings that survived the San Francisco conflagration. Both the architect and the owner consider that the roof of our tin covering this building saved it from destruction. The architect writes: "I myself helped to throw great quantities of cinders from the roof, and noted the good condition of the work after the fire. Although the building stood in the midst of a seething fire on three sides, exposed to a shower of sparks and burning embers, the tin work required only a coat of paint to restore it to good condition."

**26. PROTECTION AGAINST FIRE:** This illustration shows a row of buildings at Wills Point, Texas, as they appeared after two successive fires. The last building on the right in this row adjoins a lumber yard. This lumber yard was entirely destroyed by fire, together with the frame buildings in the rear of the store, so that the end building was exposed on two sides to the fire. Two days after the lumber yard fire, the second building from the end of the row caught fire and was entirely destroyed, as shown in the photograph. In each case the tin roofs and the fire walls, extending two feet above the roof level, saved the adjoining buildings, and on the following day both stores were doing business.



Note that the end building on the right has been *attacked on three sides by fire* without receiving more than slight damage.



**27. PROTECTION AGAINST FIRE:** In a recent destructive conflagration at Dayton, Ohio, the building in the distance shown in this illustration, marked X, was roofed with tin, and the fire was checked at this point. The tin roof effectively protected the building below from the sparks and debris falling upon it.



## 9. NEAT, HIGH-GRADE APPEARANCE.

This is a good talking point. A tin roof gives a prosperous, permanent air to a building. The smooth, flat surface where flat seams are used, and the ribbed appearance of standing-seam work, can be used to good advantage to secure certain architectural effects.

Moreover, after the first two coats of approved paint have been applied, the tin can be painted any color to conform to the color scheme of the building.

Tin roofs will be found in the majority in any well-to-do, conservative community. A "tar-and-gravel town" is a synonym for cheapness.

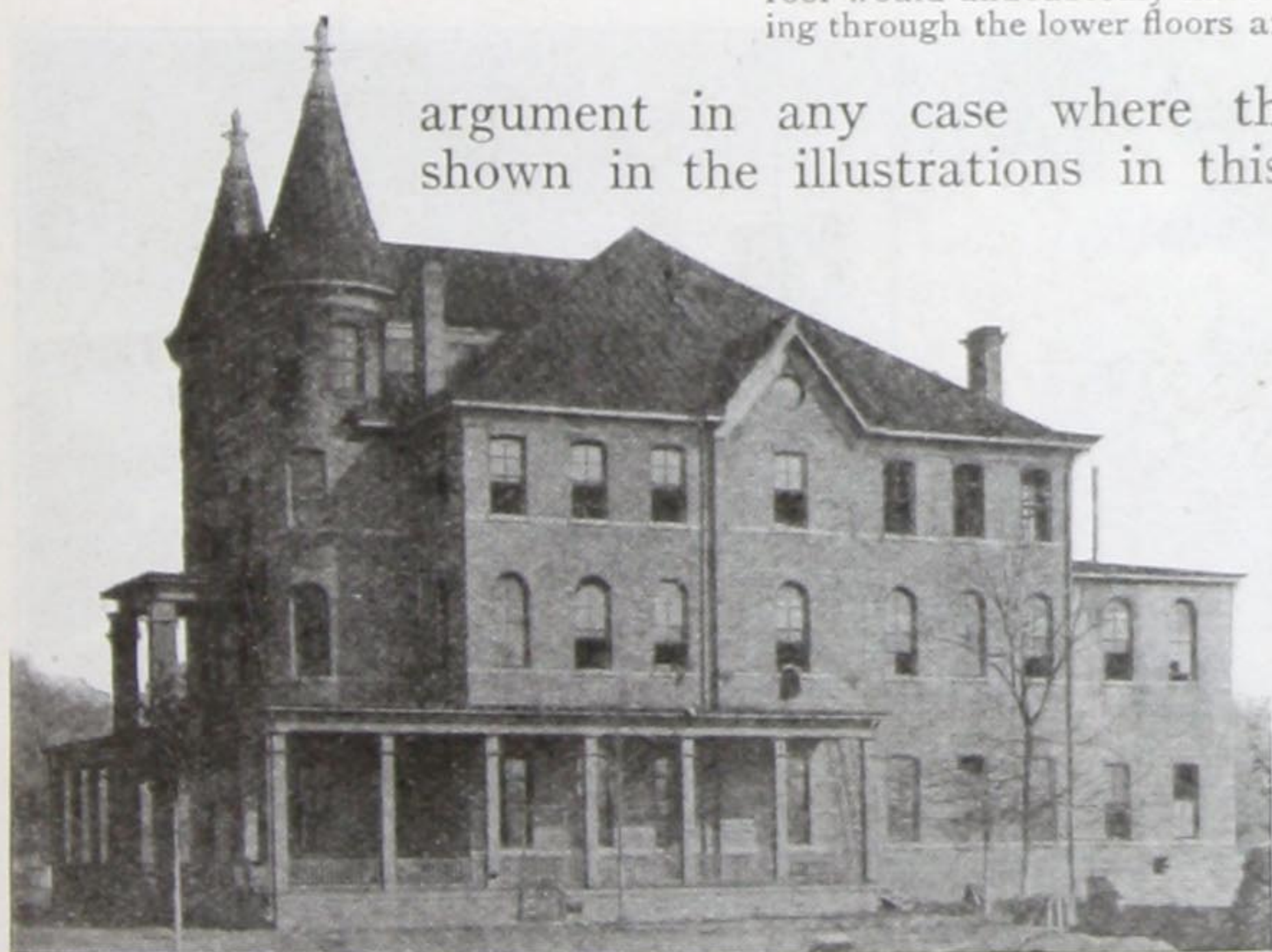
## 10. LOSES NOTHING IN APPEARANCE WITH AGE.

This is a point often overlooked, although a useful



**29. PREVENTS SPREAD OF FIRE:** Another view of the Goldsboro Orphanage fire, showing the under side of the tin. Notice that the supporting woodwork has been destroyed, leaving the tin as a mere shell. The wooden props were put in after the fire to keep the tin from collapsing in the wind.

If this building had been covered with heavy roofing, such as tar and gravel, slate, or tile, weighing from 10 to 20 times as much as tin, the roof would undoubtedly have collapsed at an early stage of the fire, breaking through the lower floors and causing loss of life.



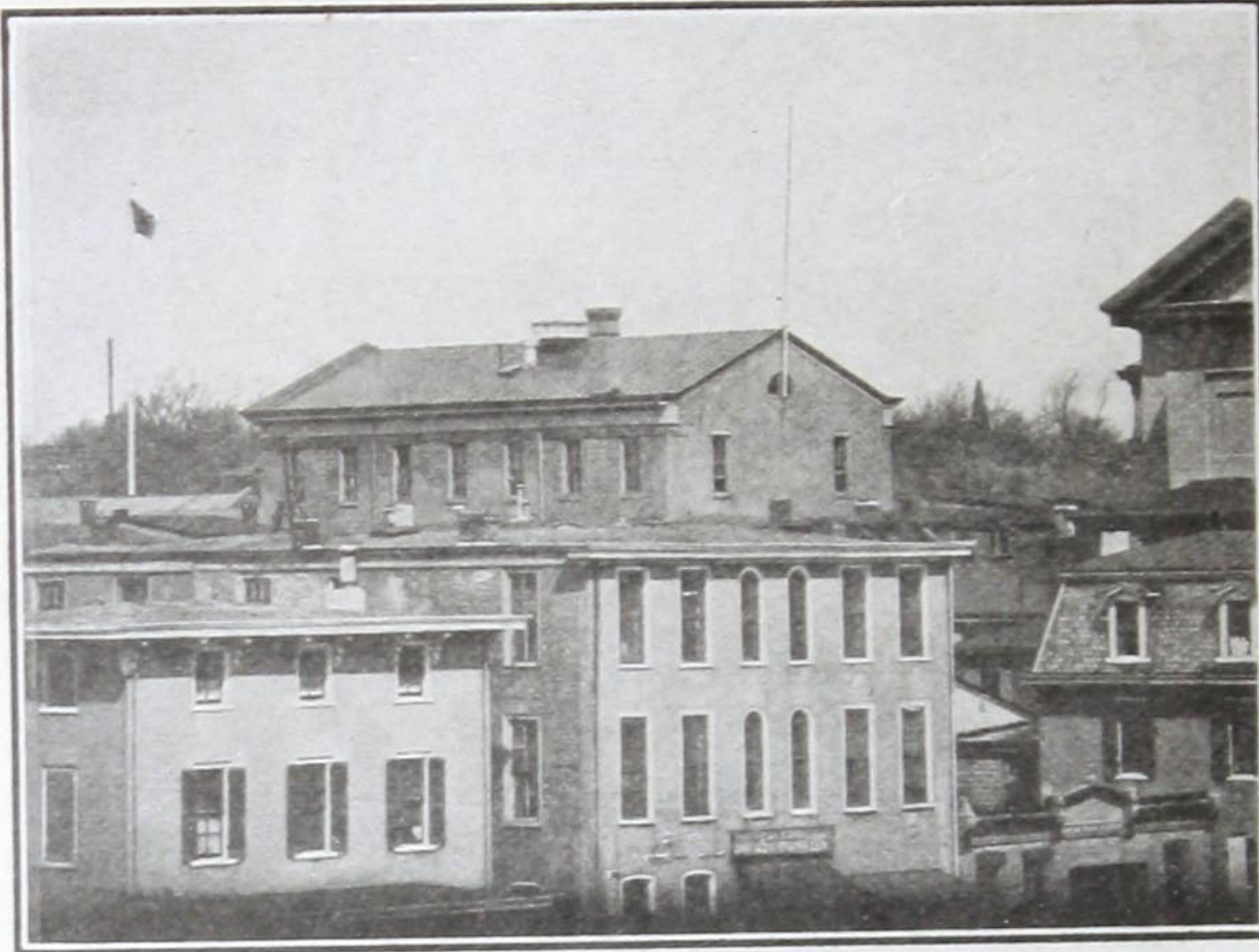
**28. PREVENTS SPREAD OF FIRE:** This view shows the Odd Fellows' Orphanage at Goldsboro, N. C., roofed with our tin, after a recent fire which started in the attic and destroyed the upper stories, at the outset imperiling the lives of 120 children sleeping in the dormitories and on an upper floor. That no lives were lost, and that the fire was controlled without further damage or spread to the surrounding properties, is largely attributed to the tin covering the building. This roof remained intact throughout the progress of the fire, confining the flames. After the fire was over, the tin still held together in its original shape, although only partly supported by charred fragments of the roof framing and sheathing-boards. The tin was left in such good condition that it seemed unfortunate that it had to be removed to build up the woodwork beneath.

argument in any case where the roof is visible. Old roofs shown in the illustrations in this book look just the same as new tin roofs. See cut No. 21 for a good example. What other kind of roofing can show a similar record? Slate, tile, and copper are practically the only ones to be considered, and none of them equals tin in this respect. With a fresh coat of paint your fifty-year tin roof is as good as new.

## 11. LIGHT IN WEIGHT.

This feature has served to bring many contracts to sheet metal roofers, particularly for factory construction. A comparison of the weights of various roofing materials is worth mentioning:





**30. PREVENTS SPREAD OF FIRE:** This illustration shows in the distance the main building of St. Vincent de Paul's Parochial School, located in Germantown, Penna. On February 1, 1909, fire started in the loft of this building directly under the tin roof, and raged fiercely for almost an hour. Although a high wind prevailed, no damage of any kind was done to any of the surrounding properties. Many old buildings surrounded the school, and if the flames had not been held in check by the tin roofing, much valuable property might have been destroyed. This roof was our best tin, put on the building in 1867—42 years before—giving entirely satisfactory service all that time. In repairing the damage done to the roof by the fire the same make of tin was used again.

Roofing-tin, IC thickness, standing seam, 65 lbs. per square.

Shingles, 400 lbs.

Four-ply composition, 525 to 575 lbs.

Slate,  $\frac{3}{16}$  inch, 650 to 700 lbs.

Spanish tile, 800 to 850 lbs.

Shingle tile, 1,200 to 1,800 lbs.

Get the architect or the property owner to figure out the saving in the construction of his building by using roofing tin. This will often be found to be enough to more than offset the higher cost of good tin over slag, composition, and other heavy roofings.

## 12. NOT AFFECTED BY HEAT OR COLD.

This feature of tin roofing commends it to the sheet-metal worker, architect, and property owner in any part of the United States, with our extreme variations of climate. Our leading make of roofing tin is equally popular in the Northwest, with its record low temperatures in winter, and in the hottest parts of the South, where composition and patent roofings are worthless. The slight expansion and contraction of the metal under varying temperatures are easily taken care of by the cleats which fasten the tin to the wood sheathing, so that even on the largest expanses there is no trace of this trouble which renders copper undesirable through its high co-efficient of expansion and contraction, resulting in broken seams and joints.



## 13. GIVES PROTECTION AGAINST LIGHTNING.

We have no authentic case on record of a tin roofed building seriously damaged by lightning.

**31. PREVENTS SPREAD OF FIRE:** This remarkable photograph, taken during the progress of a destructive fire on north Third Street, Philadelphia, shows clearly the contrast between tin and patent roll roofing from the fire insurance standpoint. On the right are three buildings roofed with tin. These tin roofs held together intact, confining the fire. Although the buildings beneath were completely burned out, the tin hung in position supported by the walls of the buildings, preventing the upward rush of the flames. On the left is a patent roofing advertised to be "fire-resisting," but actually blazing like a torch, and spreading the fire to the building it covers. This roof caught fire from a burning factory building in the rear roofed with slag. In this instance, tin roofs held the fire in check, preventing spread of the flames in one direction. The slag and patent roll roofing added fuel to the flames and spread the fire.





**32. PREVENTS SPREAD OF FIRE:** This photograph shows the white lead works of Wetherill & Brother, in Philadelphia, after a fire in March, 1907. The buildings shown were completely destroyed inside. The floors were burned away, and a part of the roof on the right wing was carried down with the wreckage. Although the heat was intense, and the fire spread with great rapidity through the buildings, the tin roofs remained intact, smothering the flames and preventing their spread to surrounding buildings and to the adjoining lumber yard shown in the photograph. Even the wooden sign on the top of the central building and the wooden clock tower were not reached by the flames. The owners report that these roofs were of the original tin put on the buildings when first erected, *80 years before*, and still in good condition at the time of the fire. After careful investigation, our best tin was selected for re-roofing the buildings.

This feature renders a tin roof especially valuable for covering barns, stables, and buildings of this kind that are commonly known to attract lightning. Experiments have shown that the best protection to a building, against damage from this cause, is theoretically, a network of wire entirely surrounding it. A metal roof covering the upper surface of the building, and connected with the ground at various points by metal downspouts or by lightning conductors, provides an easy path for the electric discharge, without serious damage to the building.

An article in a recent issue of "The Saturday Evening Post," on "The Decadence of the Lightning Rod," says:

"Lightning rods have gone out of use to a great extent. . . . One reason for the change is that tin roofs take the place of lightning rods, and are much more serviceable. Connected with the ground, as they are, by metal drain-pipes, they will carry off any amount of electricity, and are more efficient in this way when wet."

Farmers are awakening to the fact that metal roofing and siding form a protection against fire, especially in regions threatened with forest fires, which may be the cause of carrying sparks to the wood shingle roofs. Metal-covered farmhouses or private residences near a village enjoy a lower fire insurance rate, and constitute a protection to the community against disasters from fire, lightning, wind, and weather.

A veteran Philadelphia roofer, Samuel Drinkhouse, now deceased, one of the oldest and best-known roofers in Philadelphia, adds his testimony as follows:

"Another very important fact for a tin roof is that it is a great protection against lightning. I have heard my father state that, and I know of one case myself at Gloucester, N. J., where lightning struck a one-story kitchen tin roof, melted a three-inch tin pipe apart, and did not injure the roof of the house. I presume the electricity diffused itself over the area of the roof, concentrated in the small tin spout, and passed to the earth.

"Stephen Girard had all of his houses protected by having an iron band clamped around the spout-shoe and run into the ground deep enough so that it would always be in damp earth, or into the well water."

#### 14. INCOMBUSTIBLE, AND PREVENTS SPREAD OF FIRE.

This is a feature which is bound to be brought more into prominence as we come to realize the enormous loss of property annually by fire. The editor of





**33. STRENGTH:** This view of a building collapse in Pittsburg serves to show how a tin roof holds together under strain.

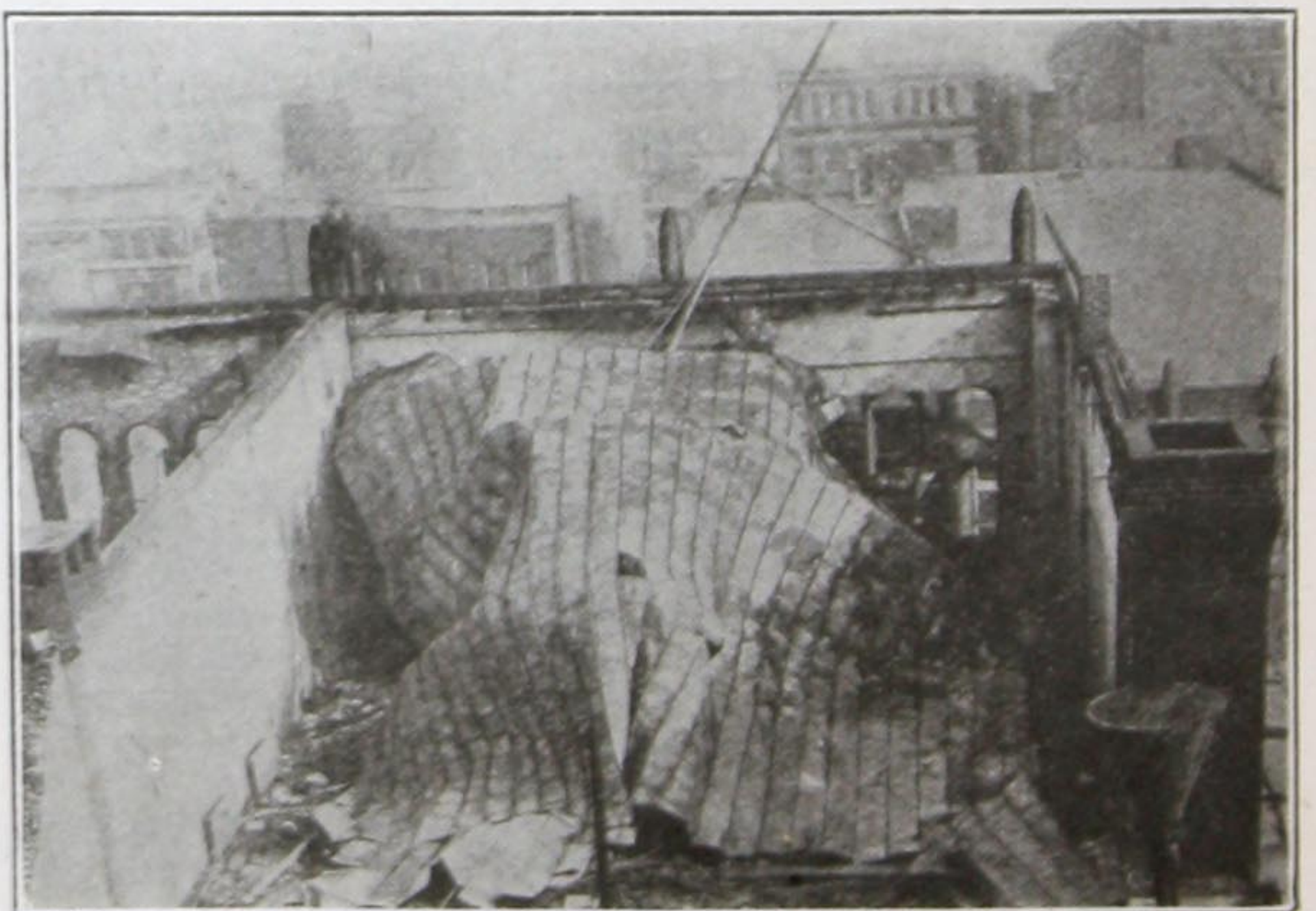
"The Engineering News," in a paper read before a recent joint meeting of the four great national engineering societies, used a striking illustration of this when he said that if the 165,000 buildings which are destroyed or damaged by fire in this country in each year, were allowed a frontage of only 65 feet each, they would line both sides of a street reaching from New York City to Chicago, and that street is being attacked by fire at the rate of three miles each day.

Roofings that are either inflammable or, although non-inflammable, fail to

resist fire, are responsible for a large part of this deplorable waste. It is unnecessary to mention the danger of wooden shingle roofs. The use of any wooden roofing in a closely built locality should properly be considered a genuine crime. The Secretary of the National Fire Protection Association says:

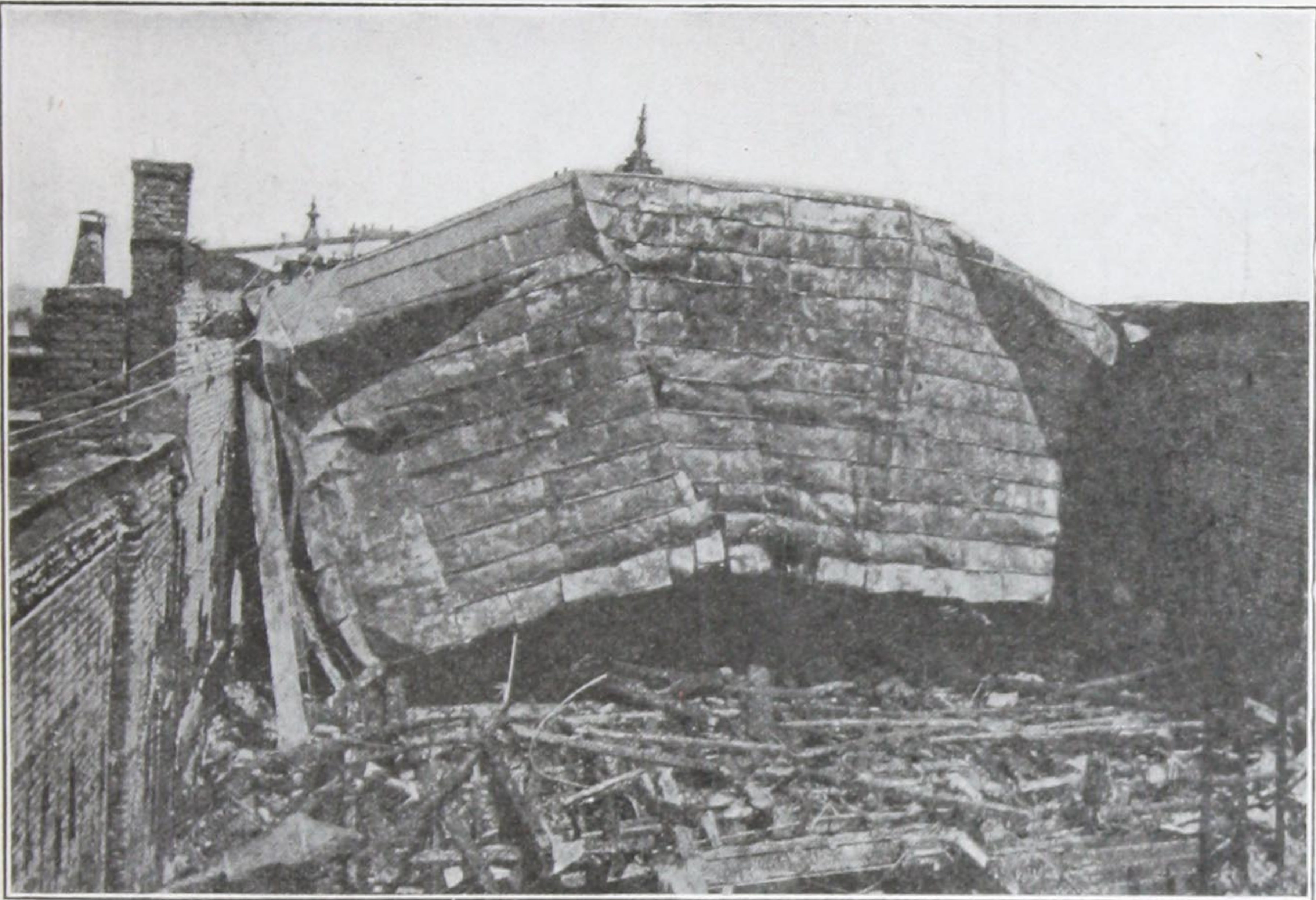
"Except that they are not placed with malicious intent, wooden shingles have all the dire qualities of fagots piled about the victim to be burned at the stake. Any person who witnessed the Chelsea, Mass., conflagration cannot be other than the enemy of the shingle roof. If the roofs of a city are incombustible, any conflagration in it will have a distinct fire-line, and this fire-line will of course extend itself as the conflagration advances. In Chelsea, after the first hour, there was no fire-line; the whole city was afire from different centers, caught from shingle roofs. The belated citizens who sought to save their goods, knew not where to fly. Horses, dogs, men, women, children, cats, and swarms of rats ran in the streets together, the live coals dropping upon them as they sought avenues of escape. They were impoverished victims of the shingle roof, but for which half the household goods of Chelsea might have been saved."

In these days, when adjoining buildings cover large areas, the power of flames to spread has been multiplied enormously, and the protec-



**34. ACTS AS A BLANKET:** This illustration of a recent fire in Baltimore shows how the tin roofing will often settle down like a blanket on the ruins, smothering the flames and checking the dangerous up-draft.





**35. PREVENTS SPREAD OF FIRE:** This view of the ruins of a recent fire in Philadelphia serves to show how well laid tin roofing will hold together and hang down like a curtain when the supports are partly destroyed. This tends to cut off the draft, holding the flames in check.

tion of the roof is one of the first necessities which the growth of this destructive power has created.

Tin roofing, tin-covered fire-doors and shutters, fireproof sky-lights, and window frames and sash for glazing with wire glass, sheet-metal fixtures for business offices, cornices, ventilators, heating systems, are all branches of your business that have directly to do with protection against fire. Tin roofing is probably the most important branch. It affords protection against the exposure hazard, of fires that attack from an outside source; and in the case of fire starting inside the building it covers, it will effectively prevent the flames from breaking through.

A tin roof prevents a fire in the same way as a tin-covered fire-door or shutter, although the roof is rarely subjected to severe heat.

If an additional precaution against fire is desired in an extreme case, cover the sheathing-boards first with asbestos paper, weighing not less than ten lb. to the square, and over this lay one thickness of deadening felt of the same weight. Upon this apply the tin roofing in the manner described in the "Tin Roofer's Handbook." The tin surface, firmly locked together, prevents fire from breaking through. The deadening felt and the asbestos paper provide a dead-air space, an effective non-conductor of heat. Tests have shown that tin laid in this way can be heated red hot without communicating fire to the wood backing. This is a very simple expedient that should satisfy the most severe requirements for fireproofing against the exposure risk. The cost of the sheathing-paper and felt amount to about 55 cents per square.

*See illustrations Nos. 22, 23.*

However, a tin roof laid in the ordinary manner is amply sufficient to protect the building against all ordinary fire hazards.

In a fire at Scranton, Pa., in 1904, flames swept across the roofs of three adjoining buildings located on Lackawanna Avenue. The central building, occupied by Gunster Brothers, had a tin roof. The stores on either side were roofed with slag. The slag roofs caught fire and, burning through, carried the flames to the floors beneath, but the middle building, covered with tin, and separated by battlement fire-walls waist-high, was not injured, although the roof was severely exposed





**36. PREVENTS SPREAD OF FIRE:** This photograph shows the roof of our tin on the department store of George B. Davis & Co., Philadelphia, after a fire that recently destroyed the building. The sheathing-boards under the tin roof shown in this illustration were completely burned away, leaving the tin supported only by the side walls and by a line of charred posts burned almost through, down the center of the building. *This tin roof effectively prevented the flames from breaking through, and held the fire within the original building, making it comparatively easy for the firemen to control the flames.*

to the flames. The morning after the fire the owners of the tin-roofed building found it necessary to do no more than clear away the ashes from the roof, and give the tin a good coat of paint.

In the Coney Island conflagration in July, 1907, where some 35 acres are said to have been burned over, the fire was finally stopped by a brick hotel and a large frame structure covered with tin, used for advertising purposes.

In the Fanley & McCrea fire at Indianapolis, the flames leaped over forty feet from the tar roof of the McCrea building, over Kiefer's tin roof, to Griffith Bros. tar roof. Had this district been covered entirely with tin the fire no doubt would have been confined to the original building. The above-mentioned buildings were completely destroyed, on account of the thousands of pounds of tar, which added fuel to the flames.

*See illustrations Nos. 24, 25, 26, 27, 40.*

It is not sufficient, however, that a roofing withstand outside fire exposure. It must also hold together and confine the flames in the case of fire within the building it covers.

A large part of our annual fire losses is due to fires that extend beyond the limit of the buildings in which they started. These losses are undoubtedly due to the inflammable construction of buildings and roofs, for in Europe, where fireproof construction prevails, there is no such loss from this source, fires being more readily confined to the buildings in which they started. Foreign countries compel insurance against fire not only for the benefit of the owner, but for his neighbor. If your building burns, you are responsible for the damage done to surrounding property.

Until similar laws are enacted in this country, we shall have to rely for better roofing conditions upon your efforts as sheet-metal workers to further the use of better roofing. The tin roof is the most desirable type, as it will hold together in a remarkable manner, even after the roof supports are entirely burned away; and we have many cases on record where the tin roof has been found after the fire, still intact, covering the ruins and preventing the upward sweep of the flames and the spread of fire to other structures by means of sparks and burning embers.





**37. PREVENTS SPREAD OF FIRE:** This view shows the under side of the tin roof shown in the preceding illustration. Note that the tin roofing remains practically intact, although the sheathing-boards below *are completely burned away*. The illustration shows clearly the under side of the tin, and the charred supporting posts and center beams. The building stands in the center of a closely built up district, and the inflammable nature of the contents made an unusually hot fire. A general conflagration was prevented by the quick work of the Philadelphia Fire Department, and, to a considerable extent, by the protection afforded by the tin roof. The owners write us that this was our tin, put on in 1835 and in 1902, giving entire satisfaction up to the time of the fire. They say: "We do not see how a better test could be arranged to show the fire protection afforded by a good tin roof to surrounding property in the case of fire starting inside the building it covers."

In the great Baltimore conflagration, February, 1904, the new Assembly Rooms were destroyed. These were covered many years before—probably fifty years—with good tin. The building caught fire about six p. m., and burned under and along the edges of the sheathing for hours, being extinguished and starting in new places. Not until three o'clock the following morning—nine hours afterward—did the building succumb, and then the tin roof lay all over the ruins, having fallen with the walls.

A disastrous fire occurred in the works of the Cumberland Steel Co., Cumberland, Md., on August 18, 1907. We quote from the Cumberland "Evening Times" of the following day:

"The heavy tin roof that covered the building prevented the flames from shooting upward to a great extent, after everything had been burned but the roof, and the tin covering rested only on the walls. The roofing would rise and fall like a sea of water during a storm. This was no doubt occasioned by the heat."

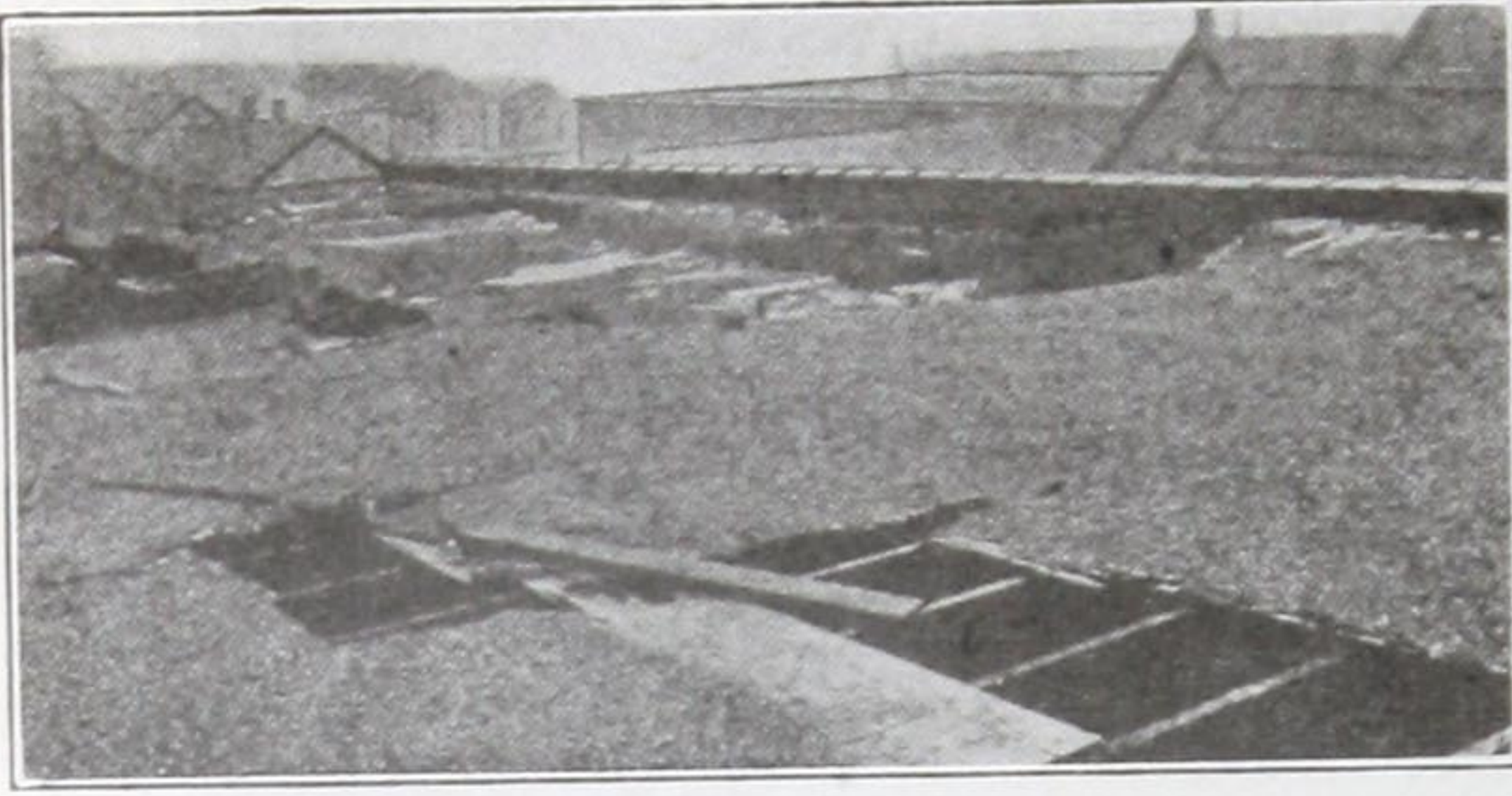
In February, 1910, a fire occurred in Wheeling, W. Va., in the most congested business block in the city, that illustrated the value of a tin roof in a first-class manner. The fire was in a drug-store of one and a half stories, built in between a hotel on one side—three stories—and a dyeing and cleaning establishment on the other. The drug store was completely gutted, but the tin roof remained intact. Had the roof been of composition the fire would have gone straight up, and ignited both other buildings.

In December, 1909, the Williams building, at Norfolk, Va., was badly damaged by fire. A correspondent there wrote us:

"This building had a gravel roof. Everybody knows that the damage would have been insignificant but for the fact that the melted tar on the roof burned furiously and stubbornly, requiring volumes of water to be poured into the building, doing almost incalculable damage. This was an ocular demonstration of the fact that tar-and-gravel roofs greatly jeopardize the safety of any building—not only the building itself, but the surrounding property. Only a year ago the Barnard building here suffered greatly from the same cause."

*For additional proof, see illustrations Nos. 28, 29, 30, 31, 32, 33, 34, 35, 36, 37.*



**38. LACK OF FIRE PROTECTION :**

As a contrast to the preceding illustration, note this view of a tar-and-gravel roof after a recent fire. Although the heat has not been sufficient to destroy the supports of this roof, nevertheless it has burned completely through the tar roof in great holes, giving a free upward draft. Much of the tar and gravel has disappeared entirely, having melted away, adding fuel to the flames.

In this case the fire department has evidently controlled the flames before the building was completely destroyed.



**39. LACK OF FIRE PROTECTION :** In January, 1910, the building at 208 Chancellor Street, Philadelphia, was partly destroyed by fire which started on the top floor, burning through the tar-and-gravel roof, of which it made short work, the burning tar and paper adding to the difficulty of controlling the fire. Thanks to the efficient work of the Philadelphia Fire Department, and in some degree to the tin roofs covering the surrounding buildings, the fire was confined to the upper stories, but not without regrettable loss of life.

This illustration shows how the tar roofing burned completely away. The occupant of the building writes us : "The roof supports were very substantial and would have held a tin roof intact, which would have prevented the loss of several thousand dollars to us from the incessant rains which occurred during the six weeks following the fire. From our experience in this case we firmly believe that with a good tin roof this fire could have been conquered in half the time and with half the loss to both building and tenants."

**40. INDIANAPOLIS FIRE TEST OF TIN AND TAR-AND-GRAVEL ROOFING :**

The flames from a hot fire alongside each roof were carried across the roof surface by sheet-iron deflectors, subjecting the roofs to intense heat. The tar-and-gravel roof softened and ignited, burning through and setting fire to the sheathing-boards. The tin roof remained practically unharmed, except for the paint blistering and the solder melting in the seams. After the test, the wood under the tin was found to be scorched. The burning composition roofing was extinguished before the roof and sheathing-boards were entirely destroyed.

In the photograph the tar roof is shown on the left, burning fiercely with a thick, black smoke. On the right is the tin roof with the surface blistered and blackened, but otherwise unharmed. Test witnessed by Fire Underwriters' Inspectors and members of Indianapolis Fire Department.





If the interior of the building is only partly damaged, a roofing that holds intact will save the contents from later damage from the weather, while a built-up composition or patent roofing containing tar, pitch or asphalt will either soften and burn through, or will drop hot tar into the building or from the eaves, adding fuel to the fire and making the work of the firemen more hazardous.

Burning pitch from a slag roof has been known to drip down the stairwell of a three-story house and set fire to the stairway on the first floor.

See illustrations Nos. 31, 38, 39, 40.

Fire Chiefs are almost unanimous upon this point. Chief Croker, of New York City, states:

"In my opinion tar-and-gravel roofs, or any other material which is not absolutely necessary, should not be allowed, as the records throughout the country show that all conflagrations have been caused by non-fireproof roofs.

"The committee which was appointed to revise the Building Code of this city, unanimously recommended that fire-proof roofs be placed on all buildings in Greater New York, irrespective of their being inside or outside of fire lines. From my experience, tar, asphalt, paper, pitch, gravel, etc., are not fireproof, and will very readily catch fire when exposed to large embers or extreme heat."



**41. WEATHERPROOF:** The old Trenton House, in Trenton, N. J., is still covered with the tin roof put on in 1809—102 years ago. This roof remains in good condition and has defied all attacks of the weather for more than a century.



**42. WEATHERPROOF:** The main building of Girard College, in Philadelphia, shown in this illustration, was built in 1830 and roofed with marble slabs from three to four feet square, by four inches thick. These were laid step-fashion, overlapping, and the builders thought they had a roof that would never require any attention. But it proved a source of constant trouble, as the marble disintegrated, the joints worked loose, and leaks developed. Finally, in 1880, the trustees were compelled to consider a new roof, to prevent further damage to the building. The choice was made in favor of good tin. Scantlings were bolted to the marble, sheathing-boards laid on these, and the tin roof laid over the sheathing-boards. This solved the problem, and there have been no complaints of the roof since, the tin being in first-class condition after nearly thirty years' service.

Fire Chief Clancy, of Milwaukee, says:

"Fire department officials in this section of the country do not consider any of these roofs (tar and gravel) of great fire-resisting value. In fact, in a majority of cases they seem to feed the flames, especially where a building collapses from fire or any other cause."

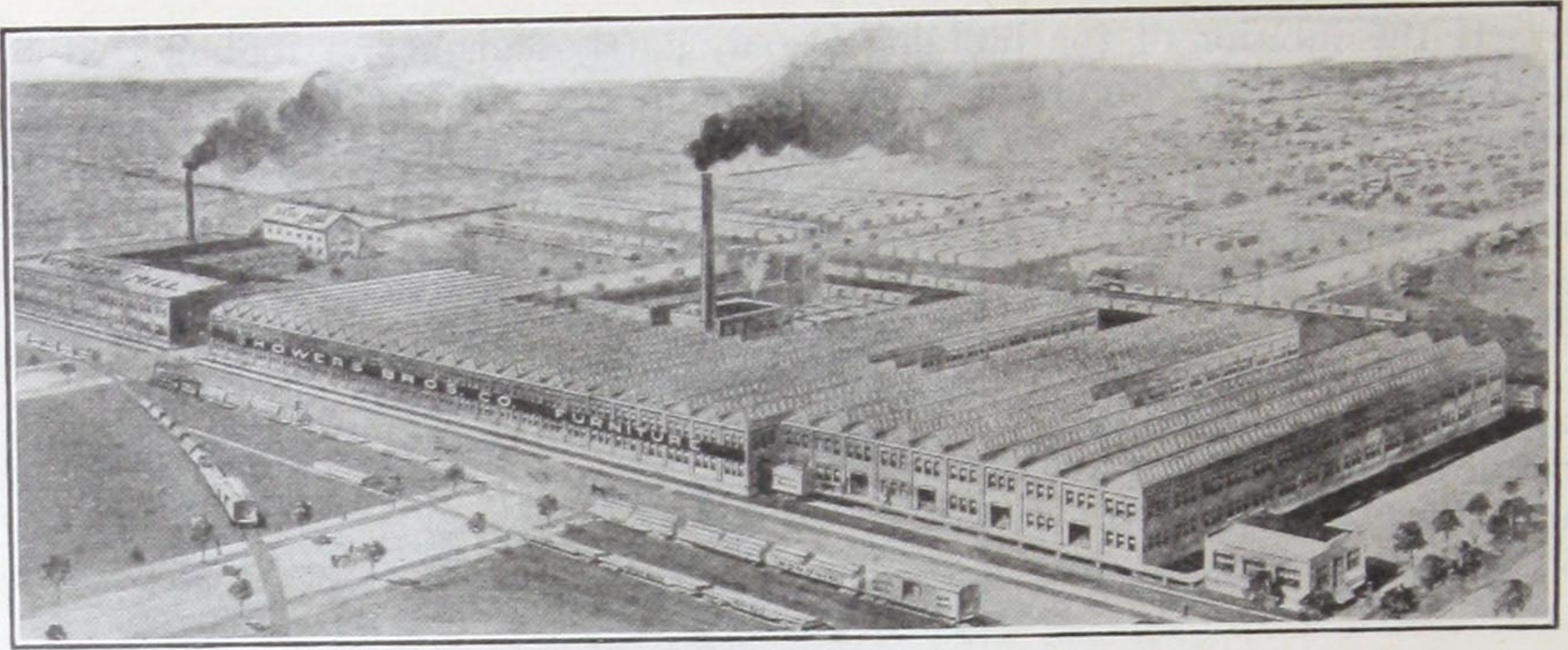
Chief Archibald, of Cincinnati, states:

"In reply to your inquiry of the 11th, I desire to state that, in my judgment, I think it foolish to allow the asphalt and pitch gravel roofs to be placed on buildings within your fire limits.

"In my experience I have had cases where a fire would leap over on just such roofs as these, and I am satisfied that if they had been of slate or metal they would have saved a lot of trouble.

"There is another objection to the pitch-and-gravel roofs, as in times of fire the down-spouts would plug up and cause a great deal of water to remain on the roofs, thereby causing great inconvenience to the firemen, and also causing them to feel uneasy while working on the roof or under it.



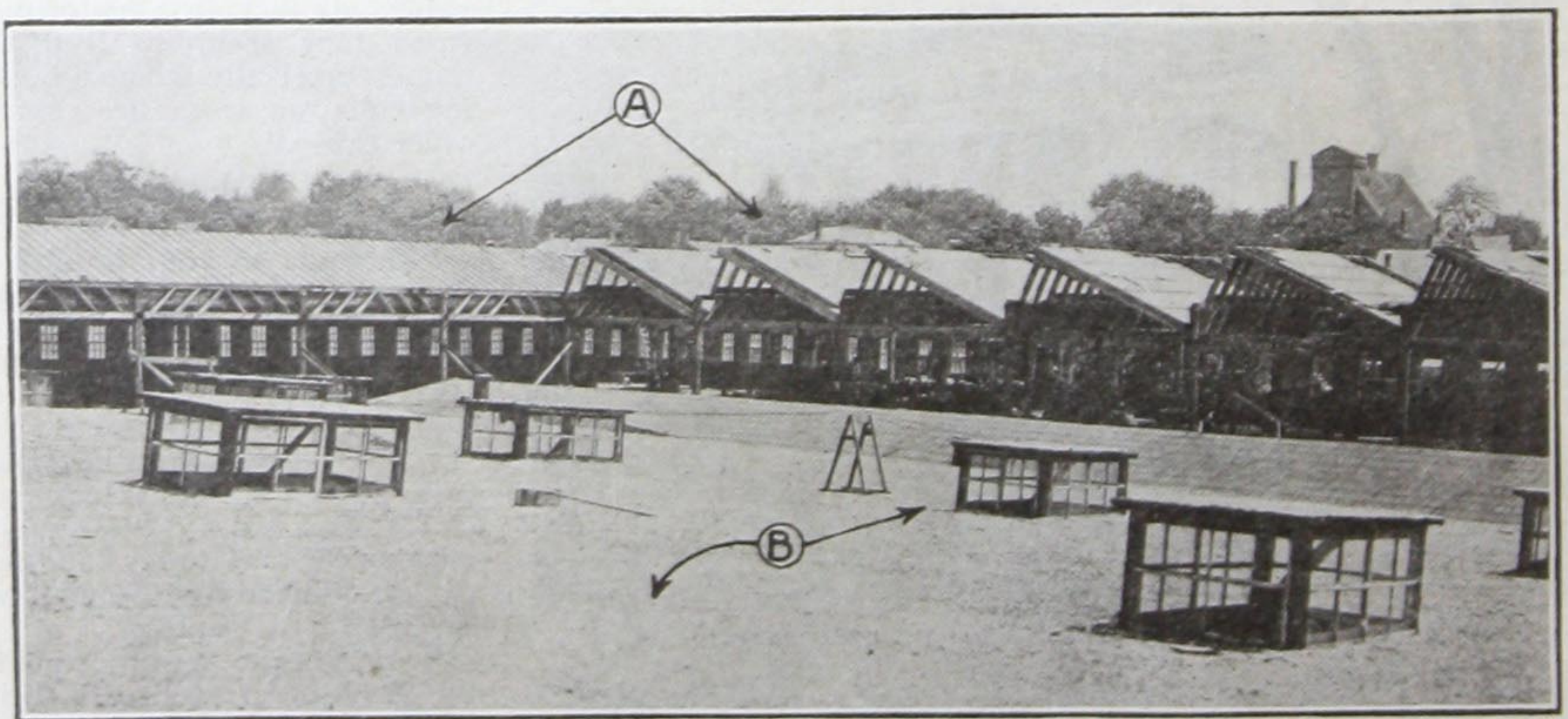


**43. NOTABLE TIN-ROOFING CONTRACTS:** General view of the factory buildings of Showers Brothers Co., furniture manufacturers, at Bloomington, Ind., recently completed. The materials selected for use in these buildings were required to be of the highest quality throughout. Good roofing tin was chosen as the most satisfactory form of roofing that could be obtained at any cost.

Those roofers who witnessed the comparative tests of tar and gravel and tin at the Indianapolis Convention will recall how the composition roof ignited early in the test, giving off dense black smoke. This smoke alone would be sufficient to cause a panic by entering the windows of buildings nearby. Sheet-metal roofers have a useful field of effort in the revision of obsolete building codes in those cities that still permit the use of roofings composed of inflammable materials.

*See illustration No. 40.*

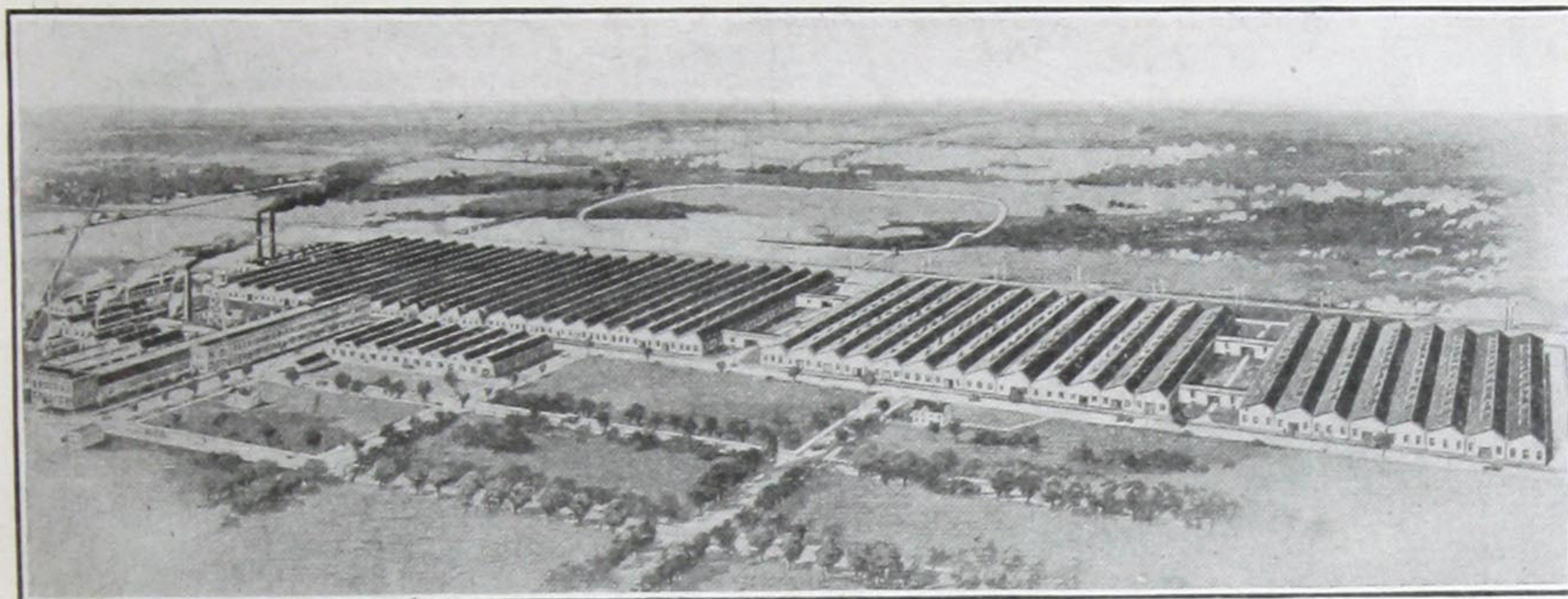
In their classification of different kinds of roofing materials used on wooden sheathing boards, the National Fire Protection Association places tin roofing at the head, taking the lowest rate of insurance. This classification is based on four points: First, ignitability; second, fire-retarding; third, wearing; fourth, possibility of spreading fire. Outside and beyond these points the committee has also considered the question from the point of view of the firemen fighting the fire. In this list,



**44. ANOTHER VIEW OF SHOWERS BROTHERS CO. FACTORY, IN COURSE OF CONSTRUCTION:** In the foreground is shown the obsolete form of skylight and composition roofing. In the background, the modern approved type of saw-tooth construction, roofed with good tin laid with standing seams. To keep the gutters free from ice and snow the overhead steam coils for the heating system run directly underneath the bottom pitch of the roof forming the gutter. Here the sheathing-boards are laid  $\frac{1}{4}$ " apart, permitting the tin to be heated from the under side by the radiating coils.

The tar-and-gravel roofs on the original buildings proved troublesome and costly, and good tin was selected for covering the new, up-to-date plant. More than 130,000 sq. ft. of tin roofing were used on the new buildings.





**45. NOTABLE TIN-ROOFING CONTRACTS:** The extensive buildings of the T. B. Jeffery Automobile Works at Kenosha, Wis., the Rambler Factory, covering some 20 acres. Charles Skidd, the roofer in charge of work at this plant, reports having used in the last six years about 240,000 sq. ft. of our best tin upon these buildings.

tin roofing is rated first, ahead of tile, slate, corrugated iron, patent or prepared composition, and wooden roofings.

This Association is the highest authority on matters of fireproofing in this country, and this rating is the result of several years of thorough, impartial investigation.

Further proof of the superiority of tin roofing is given in the findings of the Underwriters' Laboratories, which are maintained in Chicago by the National Fire Protection Association, to ascertain the value of various materials, devices, etc., from the standpoint of protection against fire. Results of these tests are published in the Quarterly Bulletin of the Association as follows:

*Roofings.*—Certain proprietary roofings listed below have been examined and tested. These tests indicate that the fire-retardant properties of these materials are inferior to those of slate, metal, or good tin-clad roofs; but in a class with those of good slag and good gravel roofs, and superior to those of wooden shingle roofs.

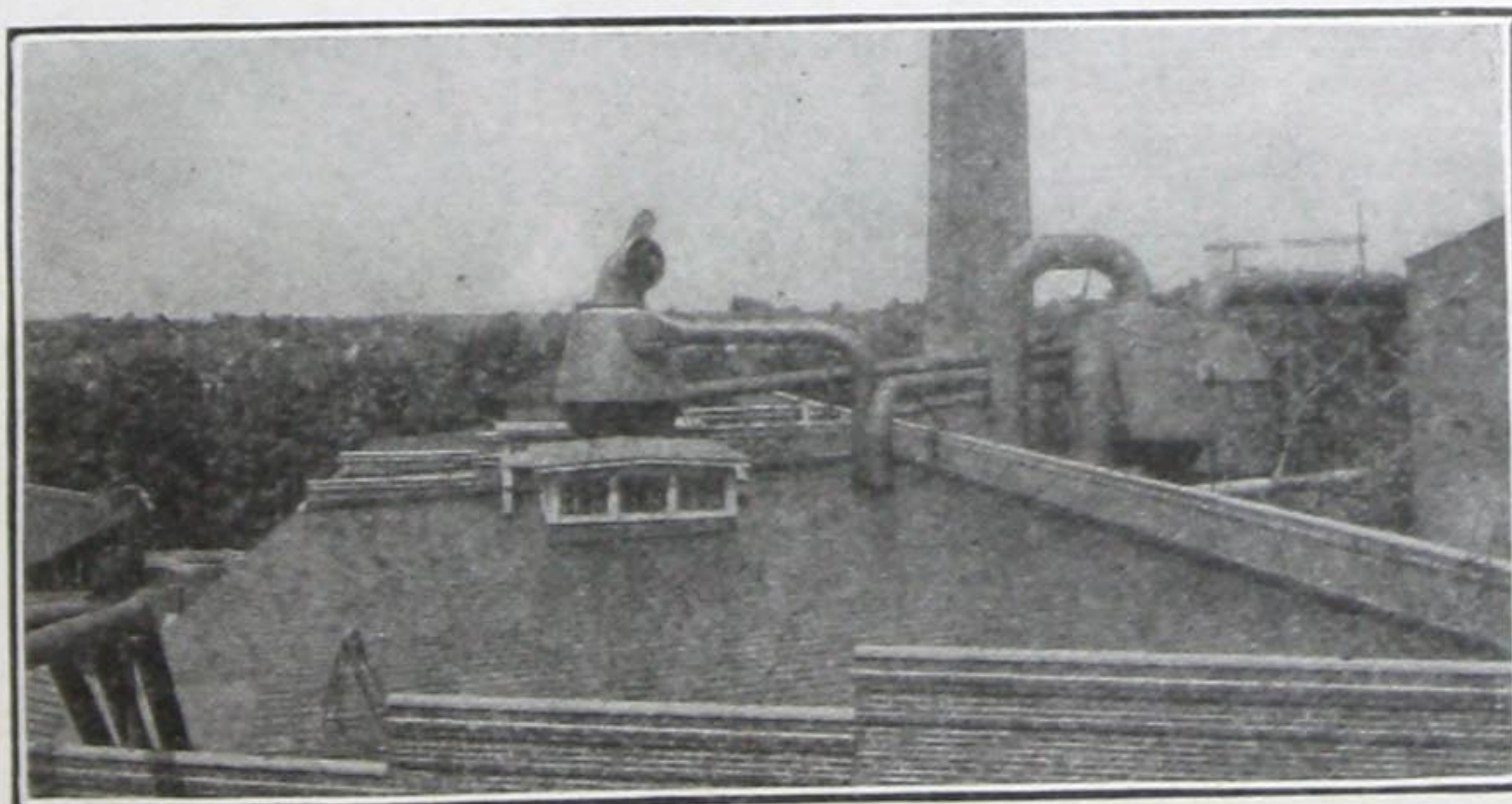
(Then follows a list of 66 brands of slag, gravel, composition, and patent roll roofings, including all the widely advertised makes.)

This report shows conclusively that in the opinion of the highest authority on fire-protection, all these built-up composition and patent roll roofings are in a lower class than roofs of good tin.

If any argument is needed to offset the extravagant claims made for patent and composition roofing, in recent years, it is furnished in these reports. Architects, builders, and roofers will do well to keep these decisions in mind in selecting the roofing material for any good, substantial building.

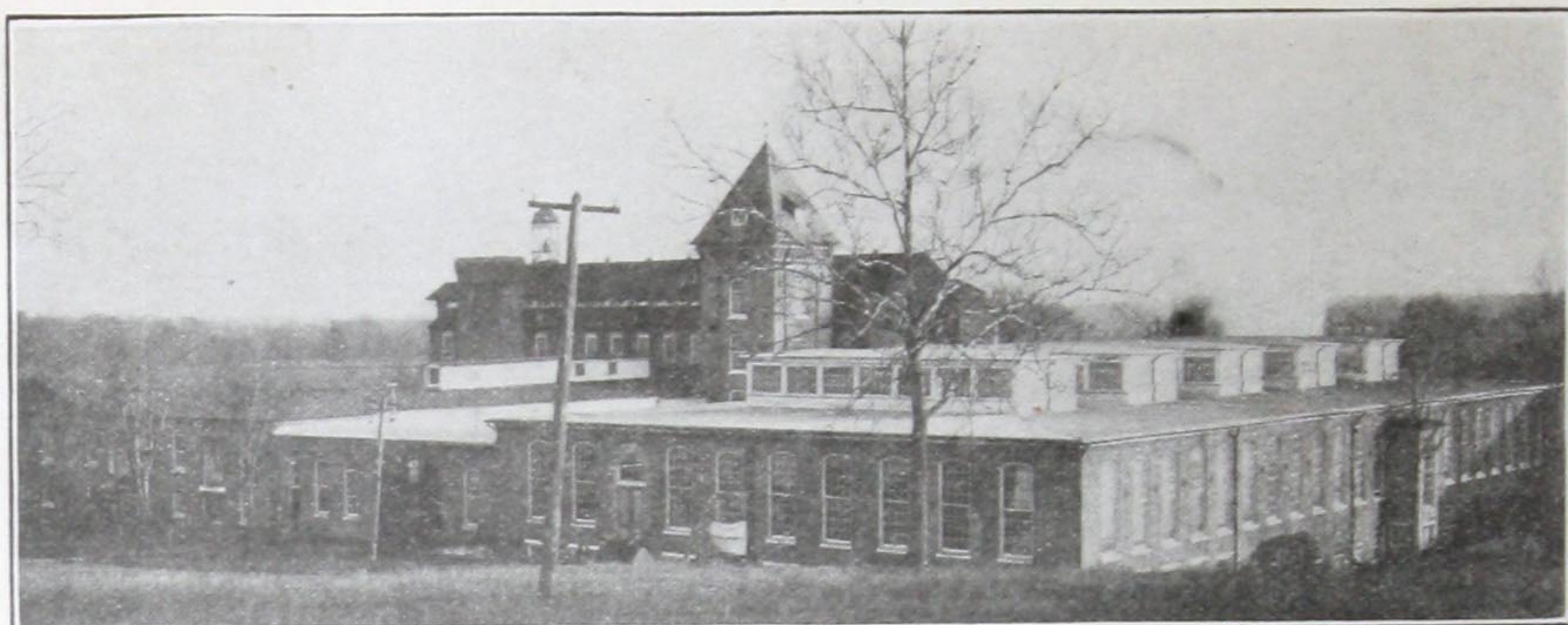
## 15. WEATHERPROOF.

In this respect, a properly laid tin roof stands supreme. It is, in effect, a continuous, unbroken sheet of durable metal through which moisture in the form of driving rain, fine snow, etc., can-



**46. GOOD TIN REPLACES TAR-AND-GRAVEL ROOFS:** Roof view, American Pad & Textile Co. buildings, Greenfield, Ohio. In 1909, Target-and-Arrow tin was used on these buildings to replace tar-and-gravel roofs, which had proved unsatisfactory. The owners write us that they are well pleased with the clean, handsome appearance of the tin roofs as compared with the dirty, unsightly tar and gravel, and they have adopted good tin as a standard for use on their buildings. They say: "We consider good tin roofs far superior to any of the so-called composition roofings."





**47. NOTABLE TIN-ROOFING CONTRACTS:** The Savage Manufacturing Co.'s mill, near Baltimore, Md., roofed in 1909 with 65 boxes of good, heavily coated roofing tin, our Target-and-Arrow brand. Charles A. Hicks, roofer. The largest roofing job laid in this part of the country for some time.

not pass. A metal roof of this type, with the joints tightly locked and soldered, is immeasurably superior to roofs made up of numerous small pieces, such as metal, shingles, slate, tile, etc., with a multitude of joints and cracks as weak points for the weather to attack.

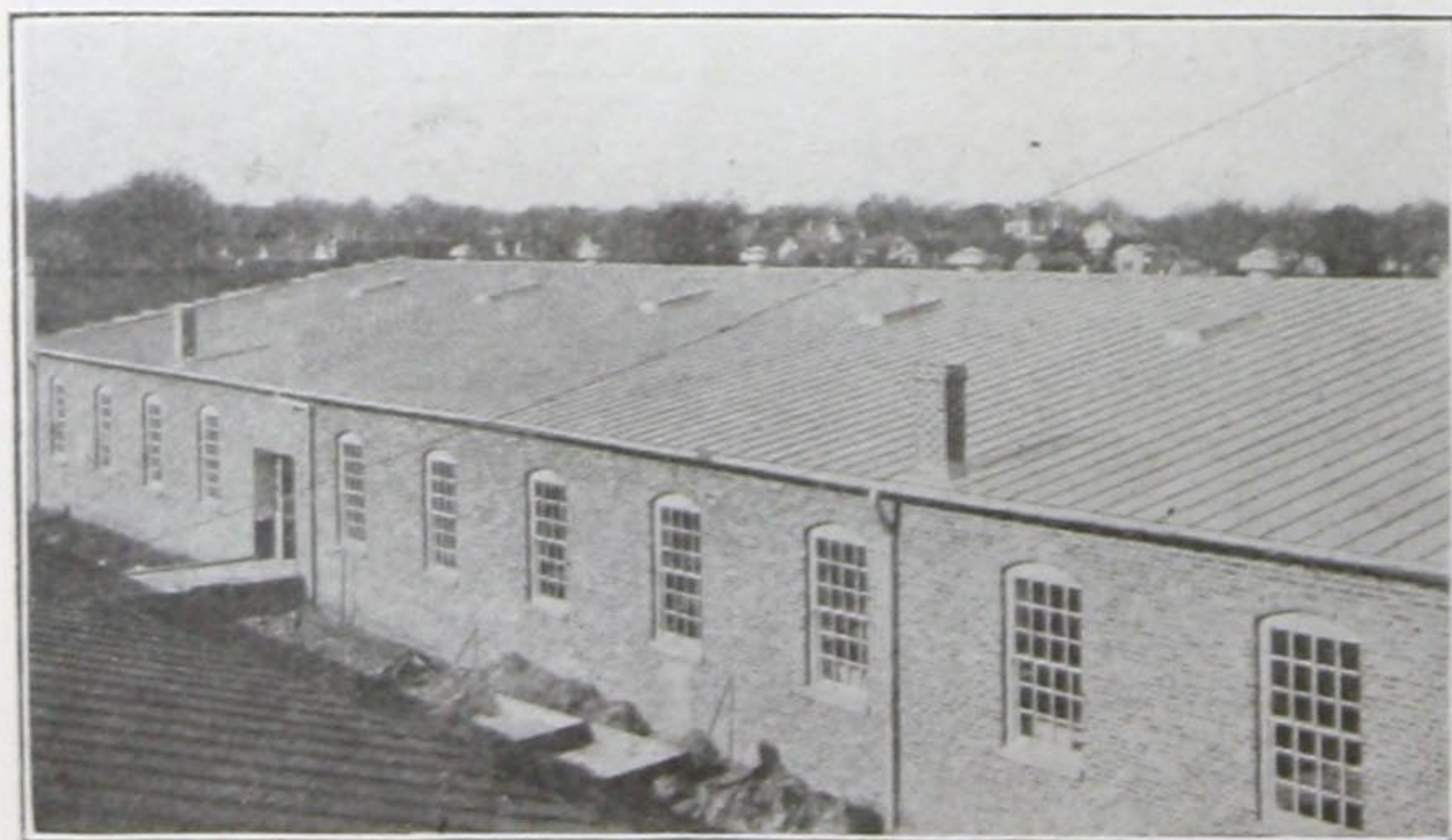
Another evidence of the superiority of tin roofing is found in its use to replace other roofings that have proved unsatisfactory.

Probably you are familiar with many instances of this kind in your own locality. A few additional cases from our files will be interesting.

The factory of the Standard Arms Co., of Wilmington, Del., one of the DuPont interests, was originally covered with tar and gravel. This proved unsatisfactory after a few years' service, and was replaced with 275 squares of our tin.

The Hartford Carpet Corporation, with extensive mills at Thompsonville, Conn., experimented with tar-and-gravel roofs. These are now being replaced from time to time with our best tin. We have already furnished large quantities of our tin for this purpose, one of the buildings recently re-roofed (measuring 123 x 387 ft.) taking over 480 squares.

The factory buildings of the American Pad & Textile Co., at Greenfield, Ohio, were originally roofed with tar and gravel, which failed to give satisfactory protection. The proprietors of this up-to-date plant then gave the roofing question careful consideration, and have adopted the use of our best tin as a standard. They express themselves as being well pleased with the new roofs of tin which have been used to replace the worn-out tar and gravel, and write us that they consider a good tin roof far superior to any of the composition roofings.



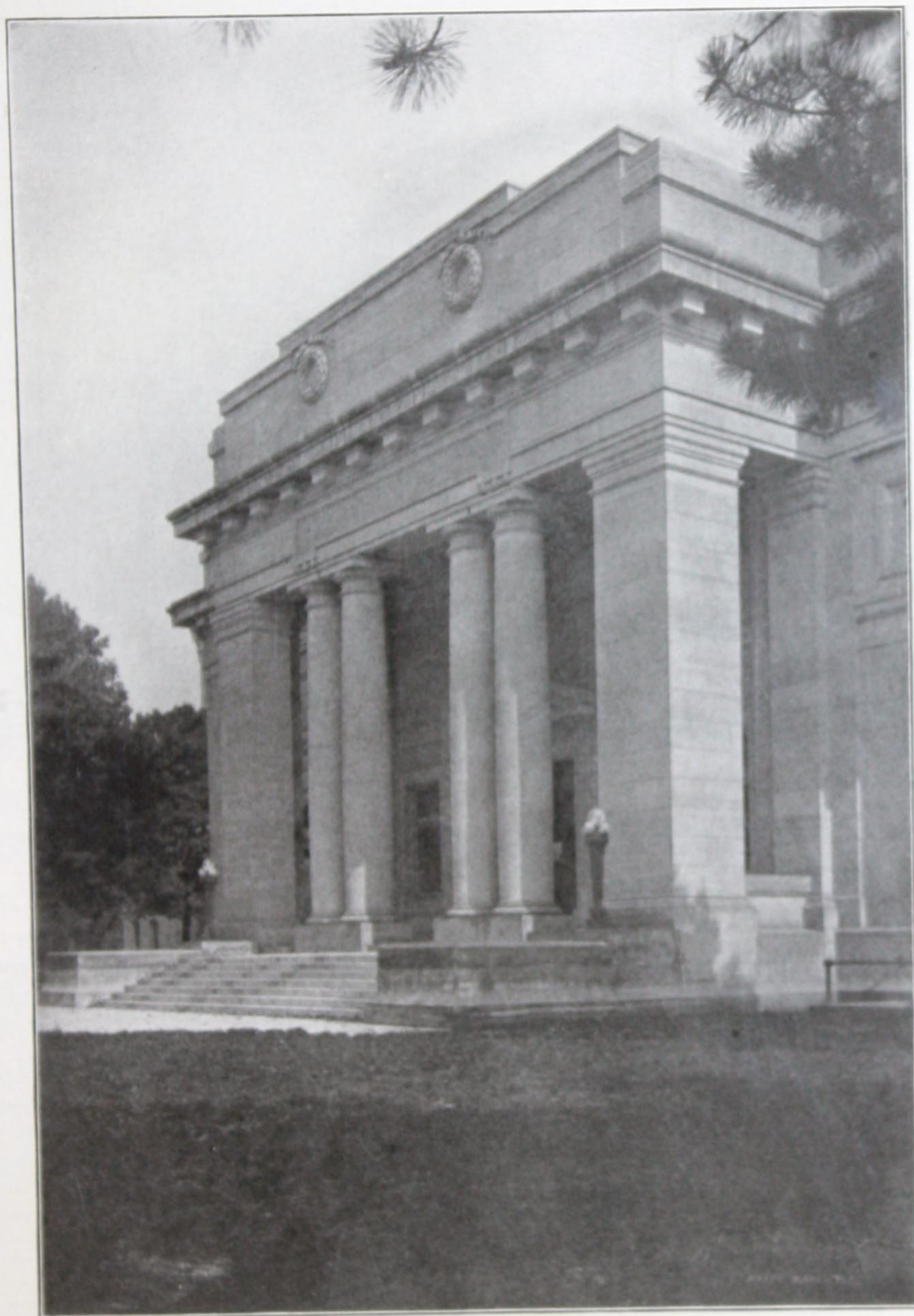
**48. NOTABLE TIN-ROOFING CONTRACTS:** Good roofing tin was used to cover the new factory building of the Hackney Wagon Co. at Wilson, N. C., in 1909. Forty boxes of Target-and-Arrow tin required. Work done by R. E. Hagan, roofer, Wilson, N. C.

The Field Building, at Denison, Texas, was originally covered with a tar-and-gravel roof. Chris. Waltz, the roofer who replaced this roof with 18 boxes of our tin, writes that the owner wants no more tar-and-gravel roofs, and that tin roofing has received another "boost" in that locality.

*For further proof, see illustrations Nos. 43, 44, 45, 46.*

After 28 years the slate roofing used on the Court House at Huntsville, Texas, was found to be in bad shape, and breaking out in places, while the deck and dome, covered with good tin put on at the same time, remain in good shape.





ALUMNI MEMORIAL HALL, UNIVERSITY OF MICHIGAN  
ANN ARBOR, MICHIGAN

Roofed with Target-and-Arrow tin  
Numerous other buildings at this institution are covered with this tin

*Donaldson & Meier, Architects*





## THE PHILADELPHIA

Roofed in 1887 with 83,600 square feet Target-and-Arrow tin, replacing copper. On this extensive series  
After 24 years' service these roofs of our best tin are in



## PENNSYLVANIA INDUSTRIAL

Wall and several buildings covered with





#### IA ALMSHOUSE

Buildings the tin roofing has given entire satisfaction where copper roofs had proved troublesome and costly. Condition, and bid fair to outlast the buildings they cover.



#### ORMATORY, HUNTINGDON, PA.

square feet Target-and-Arrow roofing tin.





KRISE BUILDING, LYNCHBURG, VA.

One of Lynchburg's finest office buildings. Built in 1906. Roofed with Target-and-Arrow tin.

*Frye & Chesterman, Architects*

*T. B. Dornin-Adams Co., Roofers, Lynchburg, Va.*



The Franklin Institute, of Philadelphia, selected our tin several years ago to replace the slate roof upon their historic building, one of Philadelphia's most cherished landmarks. This structure now has a roof that will undoubtedly outlive the building.

We have also many cases on record of copper roofs proving unsatisfactory and being replaced with tin.

One of these most frequently referred to is that of the buildings of the Philadelphia Almshouse, covering an extensive area in West Philadelphia, re-roofed in 1887 with some 89,000 sq. ft. of our tin. Those tin roofs are giving splendid satisfaction where copper failed, and the problem of roofing these large buildings has been satisfactorily solved.

In 1835 the Merchant's Exchange Building at Third and Walnut Streets, now occupied by the Philadelphia Stock Exchange, was roofed with 16-oz. copper, supposed to be the heaviest copper roof in the country. This copper roof was removed in 1859 and replaced with good roofing tin, which remained in good condition until the building was remodeled in 1905. When the copper roof was removed it was found to be cracked and torn at a great many places, from the contraction and expansion of the metal. The roofers in charge of the work collected 500 lbs. of plumber's solder from the old copper roof, which had been repaired by plumbers making thick wiped joints. The roofer took the old copper in exchange for the new tin roof, and paid in addition \$500 for the contract. The sale of the copper, at 29c. per lb., netted the roofer \$3000 clear profit on the job.

A tile roof covering one section sylvania, Philadelphia, proved unsatisfactory with a metal roof. Our tin had been small roof adjoining. This tin was gutters on the building had been re-copper for the new roofing work, but the committee's attention to the good contrasted with the trouble experienced this case: the committee was willing to other evidence, finally decided in favor

*For further evidence, see illustration, No. 42.*

The future of the tin roofing of the material and the quality of turer and the roofer respectively common interest with you as the highest standards both for material and for workmanship.

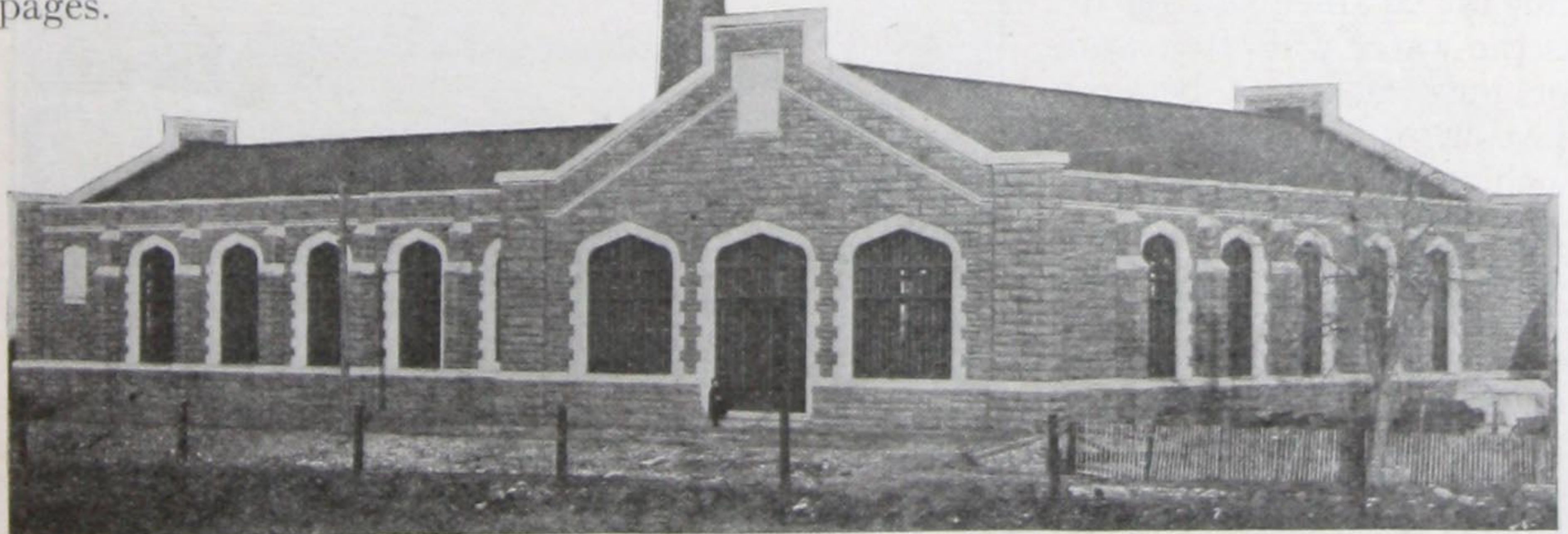
Our best tin, the "TARGET AND ARROW" brand, formerly known as "Taylor's Old Style," represents the same durable quality that we sheet-metal roofing trade for more than has been rigidly maintained notwithstanding competition of every kind. Apply this tin properly to the roof and you can depend upon it to fulfill all the advantages set forth in these pages.

of the Library Building at the University of Pennsylvania, Philadelphia, proved unsatisfactory, and the authorities desired to replace it used twenty years before to cover the tower and a found to be in perfect condition, while the copper paired several times. The authorities preferred the roofer recommended the use of our tin, calling service of this tin on another part of the building, with copper in the gutters. Cost was no object in use copper, but upon the strength of this and of our tin.

*tion, No. 42.*

industry depends largely upon the quality workmanship furnished by the manufacturer. We, as manufacturers, have a users of our products, in maintaining the material and for workmanship.

AND ARROW" brand, formerly known sends the same durable quality that we sheet-metal roofing trade for more than has been rigidly maintained notwithstanding competition of every kind. Apply this tin properly to the roof and you can depend upon it to fulfill all the advantages set forth in these pages.



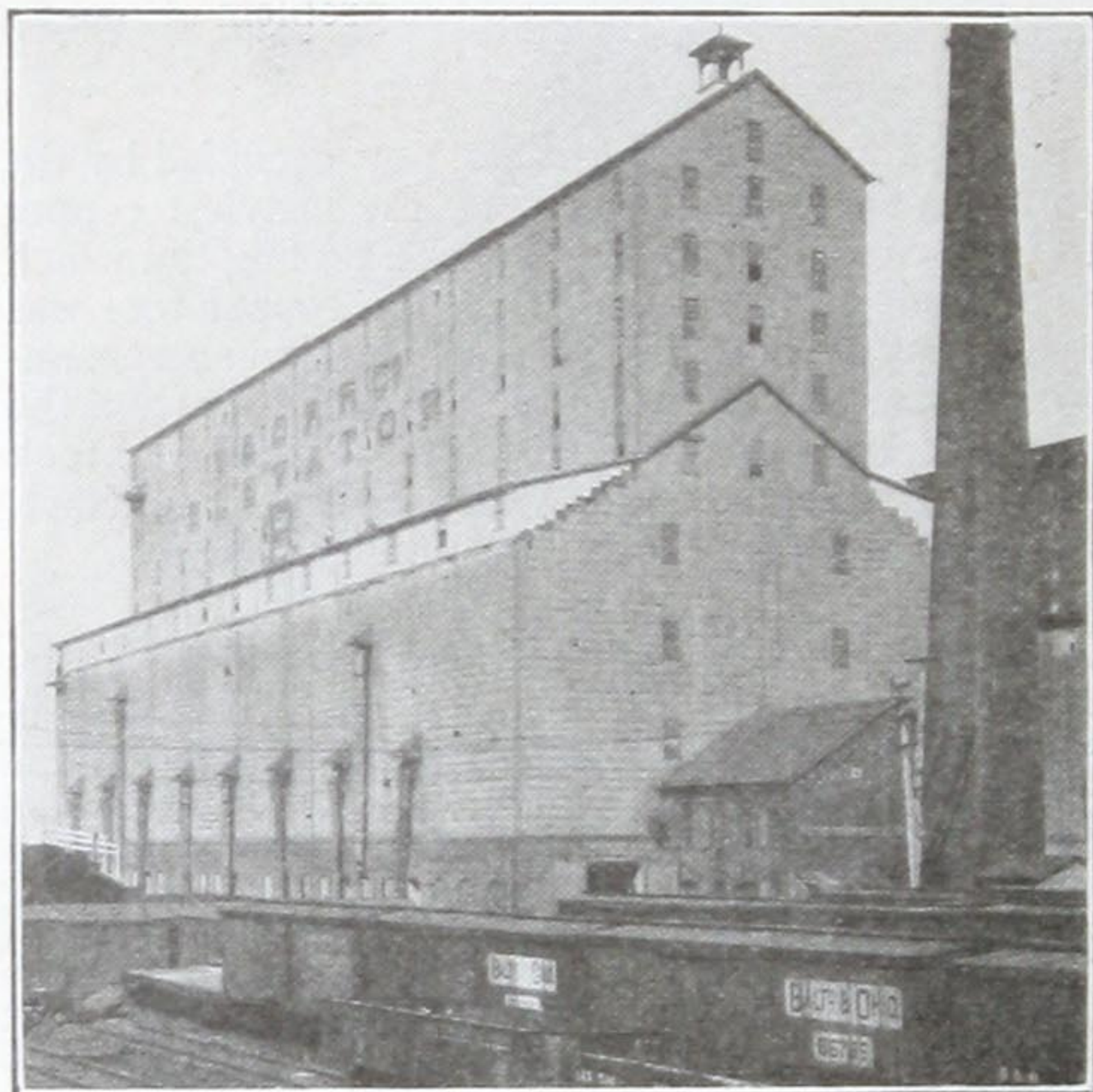
**49. NOTABLE TIN-ROOFING CONTRACTS:** Power plant, University of Colorado, Boulder, Colo. Gove & Walsh, architects, Denver, Colo. Roofed with 100 squares Target-and-Arrow tin laid standing-seam. A fine example of the use of high-grade roofing material for a first-class, substantial building.



## FACTS TO REMEMBER

### A GOOD TIN ROOF IS—

**Better than slate**, which is heavy, cracks in extreme cold weather or under sudden changes of temperature, or from accidental blows; fades in color, is exceedingly difficult to repair, and can only be laid on very steep surfaces.



**50. NOTABLE TIN-ROOFING CONTRACTS:** Elevator B, of the Baltimore & Ohio Railroad Company at Locust Point, Md., roofed in March, 1909, with 180 squares of our Target-and-Arrow tin by George J. Laynor & Sons, Elk Ridge, Md.

Slate makes a very hot roof; it is black, with a heavy body, and retains heat a long time.

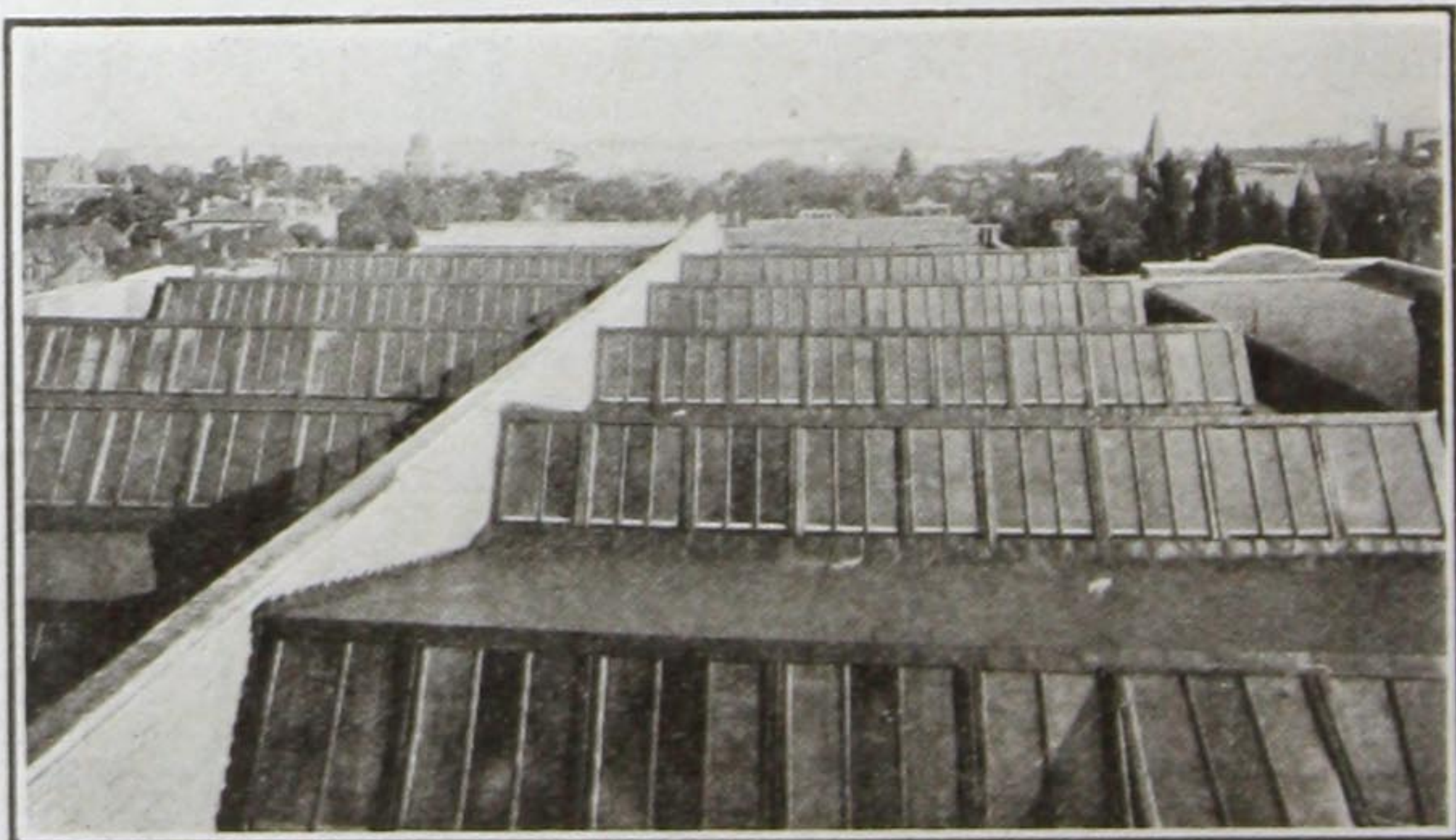
A tin roof is thin and light. A slight shower or a passing cloud helps to cool it, and it cools off quickly at night. Unless the slates are put on with brass or copper nails, moisture will soon attack the iron or steel nails, and when these rust through there is nothing to hold the heavy slates.

In a high wind, rain and fine snow will drive up through the cracks and interstices of a slate roof. The nails in a tin roof are completely protected from the weather, and the surface of the tin is continuous, without openings through which the moisture can penetrate.

**Better than tiles**, which are difficult to lay tight, admit wind and moisture, and are heavy, requiring extra strong roof construction.

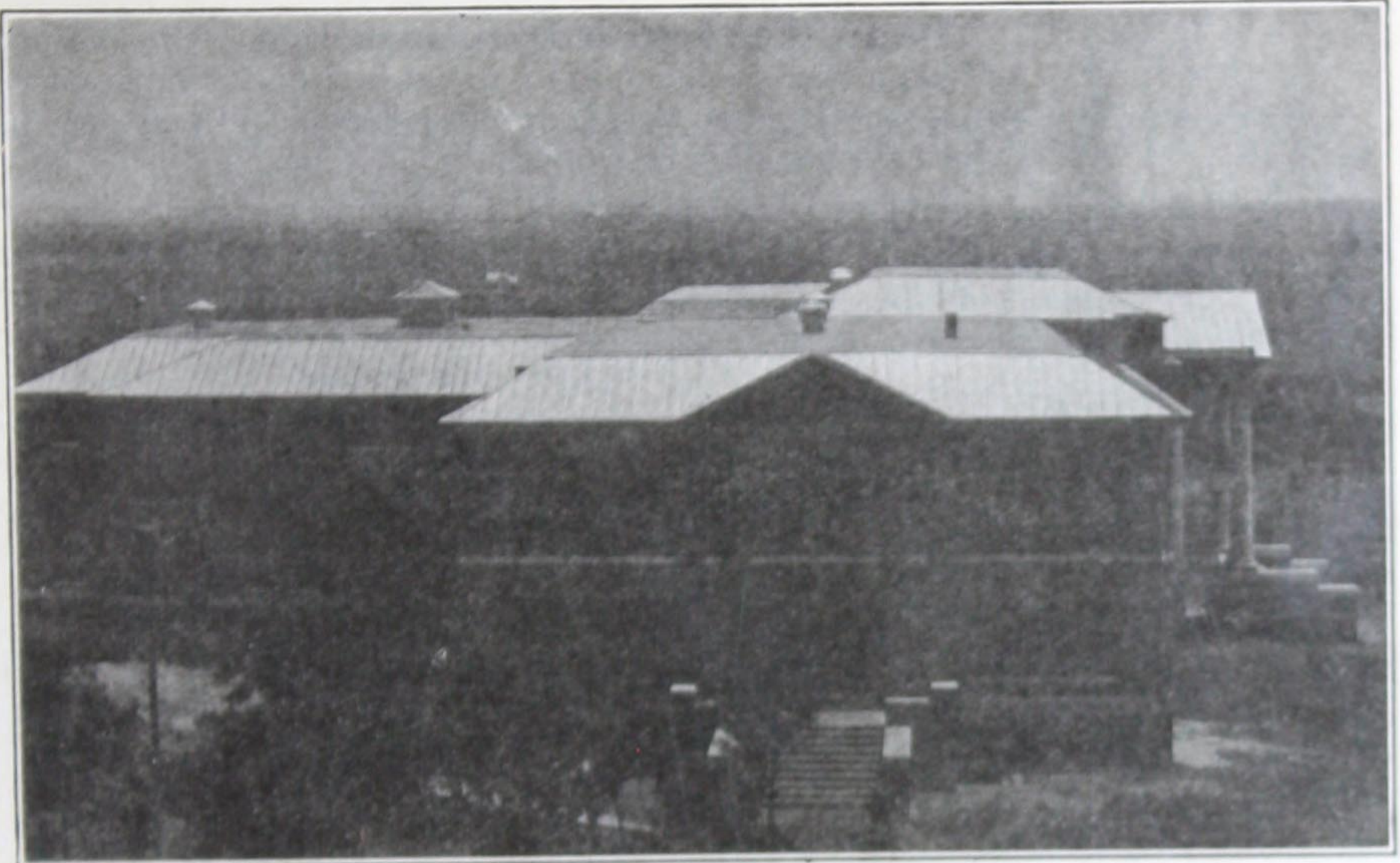
**Better than wooden shingles**, which warp, rot out, split, absorb water, and remain damp; and in hot weather they are easily set afire by a spark. Modern shingles are usually sawed instead of split, as in the old days, and do not last long. Like slate and tile, shingles are only adapted to steep roofs.

**Better than gravel, slag, or composition roofs**, which are made of perishable, inflammable materials. Such roofs are practicable only on very flat surfaces—less than three inches slope to the foot—and are a constant menace from fire to the buildings they cover. Leaks in roofs of this kind are very difficult to trace and repair, as the water will often work for long distances between the courses of paper and felt. Such roofs are dirty and frequently clog the gutters and downspouts with tar and gravel. In case of fire they add fuel to the flames, and render the work of firemen doubly hazardous from the burning pitch, which drips through to the lower floors and from the eaves. The extreme danger from fire



**51. NOTABLE TIN-ROOFING CONTRACTS:** Roof view, Canadian Kodak Company's buildings, Toronto, Canada. A good example of the highest type of factory roof construction, comprising wire glass set in metal frames for the skylights, and Target-and-Arrow tin for the flashings, gutters, and roof surfaces.





**52. AN IMMENSE JOB OF TIN ROOFING:** The roof of the State Normal School, Weatherford, Okla., was completed in March, 1910, requiring about 75 boxes of Target-and-Arrow tin. Work done by the Globe Roofing & Cornice Co.

with roofs of this class will be realized by noting the amount of highly inflammable material applied to every ten feet square, namely:

For a four-ply tar and gravel roof—

Tar, 120 lbs. per 100 sq. ft.

Felt, 56 lbs. per 100 sq. ft.

Paper and felt are perishable materials, and tar and pitch, exposed in a thin layer to the action of heat and cold and the weather, soon dry out, crack, and lose their waterproof value.



**53. NOTABLE TIN-ROOFING CONTRACTS:** Wilmington, Del., High School building, roofed with Target-and-Arrow tin in 1890. 14" x 20" sheets laid part standing-seam and part flat-seam, with cleats. Painted with metallic brown paint. Roof remains in first-class condition.



**Better than any ready-made roofing**—felts and paper and patent roll roofings, which are at best only temporary coverings, and bag and buckle and look cheap and poor, and help to feed the flames in case of fire.

**Better than copper**, especially for large surfaces, as the great expansion and contraction of this metal under varying temperatures causes it to break apart at the seams. Copper will "craze" and "creep" under certain conditions. Much of the sheet copper sold nowadays does not seem to have the weather-resisting qualities of the old-time metal obtained by cruder methods of smelting.

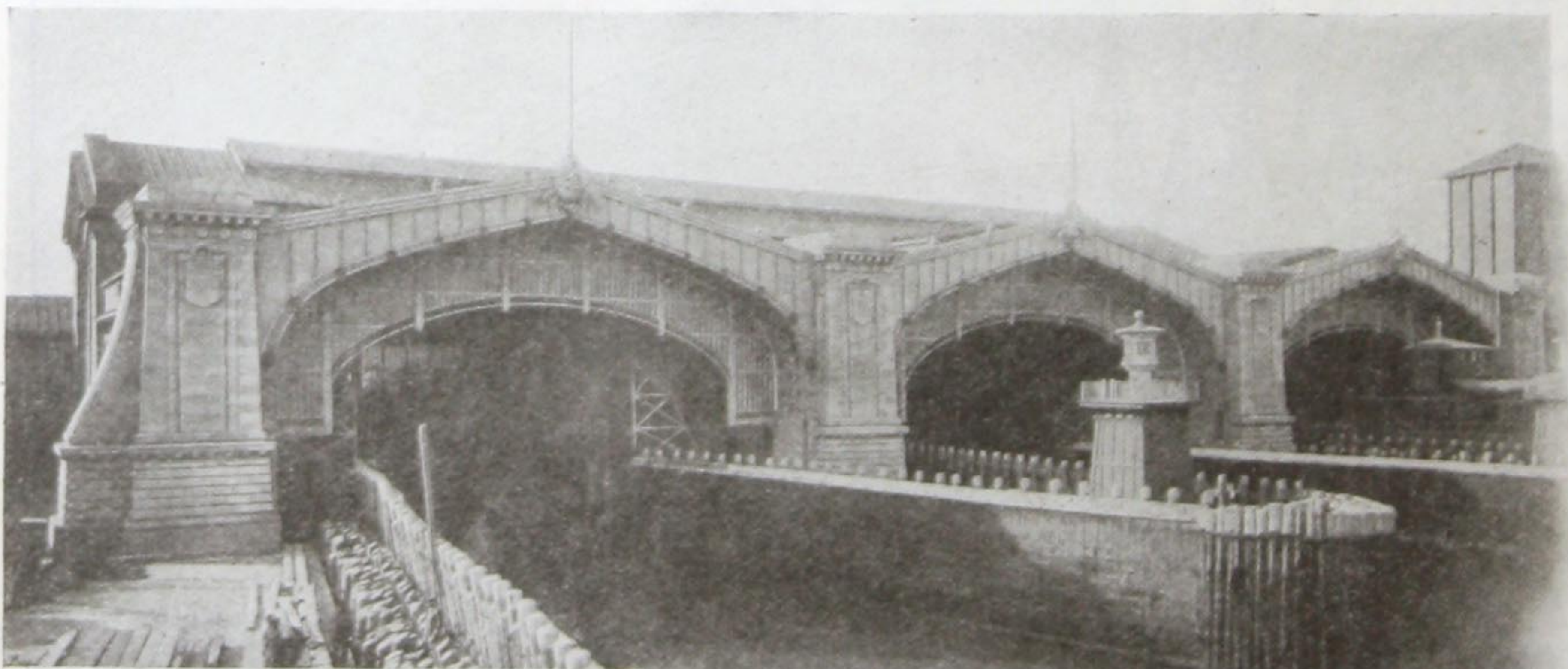
**Better than zinc**, which disintegrates on exposure to our atmosphere, particularly in salt air along the sea-board.

**Better than sheet lead**, which creeps and draws itself out thinner and thinner until it falls apart. Both zinc and lead will melt and run down under moderate heat in case of fire.

**Everyone who has had experience with good tin roofs will acknowledge these facts. The statements and attacks made against tin roofs by promoters of other kinds of roofing apply only to cheap roofing plates, the inferior output of an extensive industry. Such statements are not true of the old-time heavily coated, well-made plates, which have always given such excellent satisfaction.**



**54. NOTABLE TIN-ROOFING CONTRACTS:** Immaculate Conception Cathedral, Denver, Col. 8000 square feet of Target-and-Arrow tin used for decks, gutters, etc. Gove & Walsh, architects, Denver, Colo.



**55. NOTABLE TIN-ROOFING CONTRACTS:** St. George Ferry Terminal, St. George, Staten Island, N. Y. Roofed with 50,000 sq. ft. of our tin by Smith & Dorsett Co., roofers, New York City.



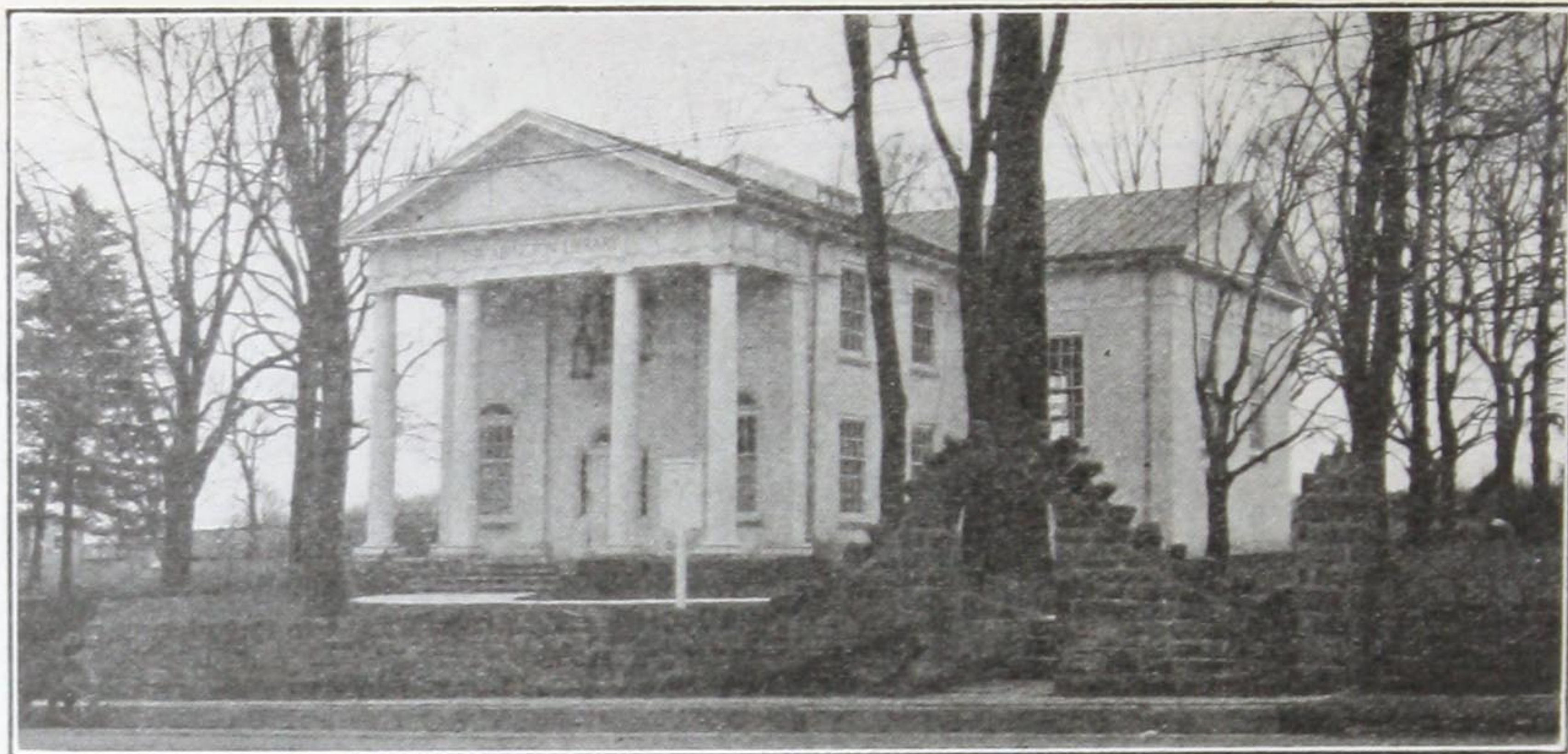


**56. NOTABLE TIN-ROOFING CONTRACTS :** Norfolk & Western Railway Depot, Petersburg, Va. Roofed with 6000 sq. ft. of Target-and-Arrow tin by Brunet & Somers, roofers, Petersburg, Va.

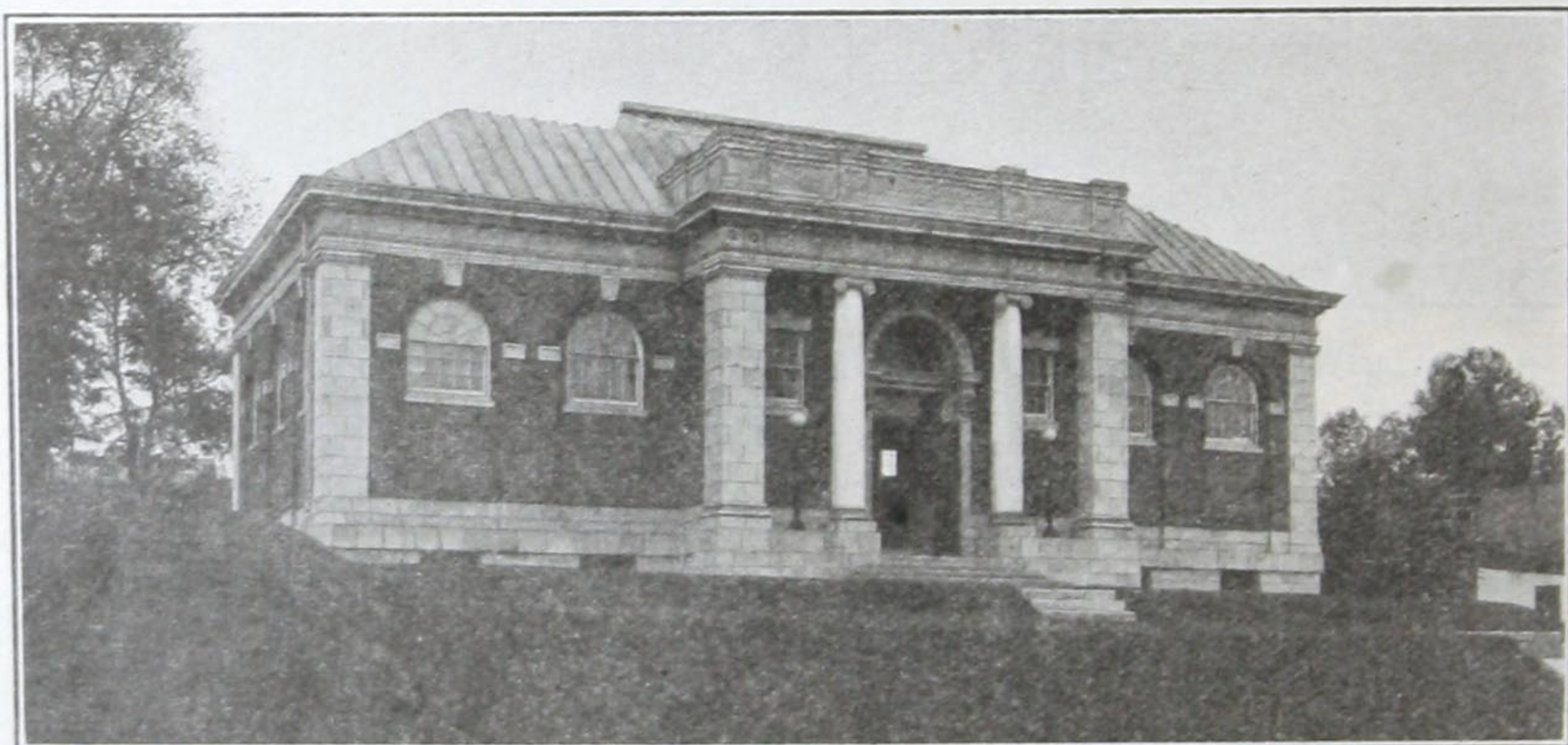


**57. NOTABLE TIN-ROOFING CONTRACTS :** A good example of the use of roofing tin on a large stable of modern construction at an extensive country estate near Baltimore, Md. Roofed with 20,000 sq. ft. of Target-and-Arrow tin by John G. Hetzell & Son, roofers, Baltimore. Slate-colored paint was used on this roof to harmonize with the character of the building.





**58. NOTABLE TIN-ROOFING CONTRACTS:** The Abington Library, Jenkintown, Pa. An interesting landmark on the Old York Road, near Philadelphia, dating back to 1857. Covered with Target-and-Arrow roofing tin, 1X thickness, laid with standing seams. W. C. Fleck & Bro., roofers, Jenkintown, Pa.



**59. NOTABLE TIN-ROOFING CONTRACTS:** Wissahickon Branch, Free Library of Philadelphia, Wissahickon, Pa. Roofed with Target-and-Arrow tin, 1X thickness. H. Ottinger & Co., roofers, Philadelphia. A good illustration of the heavy ribbed effect secured by shaping the tin over wood strips. Roofing tin laid in this way gives the appearance of a copper roof, especially if painted green. Such a roof has all the durability of copper, and is free from the broken seams, costly and difficult to repair, caused by the high co-efficient of expansion of copper. Leaks of this kind in copper roofs often cause heavy damage to interior decorations and fittings. Good tin solves this problem completely.



**60. NOTABLE TIN-ROOFING CONTRACTS:** Agnes McClung Hall, Mary Baldwin Seminary, Staunton, Va. Nolan & Baskerville, architects, Richmond, Va. Roofed with Target-and-Arrow tin laid standing seam. Numerous other buildings at this institution are roofed with this tin.



## HOW A TIN ROOF SHOULD BE LAID

*These suggestions are in accordance with the standard working specifications adopted by the National Association of Sheet Metal Contractors*

### SLOPE OF ROOF

If the tin is laid flat seam or flat lock, the roof should have an incline of one-half inch or more to the foot. If laid standing seam, an incline of not less than two inches to the foot. Of course, good tin is constantly being used with entire success on roofs of less pitch than this, some of them almost flat, but a good pitch is desirable to prevent any accumulation of water and dirt in shallow puddles. Gutters, valleys, etc., should have sufficient incline to prevent water standing in them or backing up in any case far enough to reach standing seams.

Tongued and grooved sheathing-boards are recommended, of well-seasoned dry lumber, narrow widths preferred, free from holes, and of even thickness.

A new tin roof should never be laid over old tin, rotten shingles, or tar roofs.

Sheathing-paper is not necessary where the boards are laid as specified above. If steam, fumes, or gases are likely to reach the under side of the tin, use some good water-proof sheathing-paper, such as black Neponset. Never use tar-paper.

Seams should be made as shown in the accompanying illustrations. No nails should be driven through the sheets.

### FLAT-SEAM TIN ROOFING

When the sheets are laid singly, they should be fastened to the sheathing-boards by cleats (*see Fig. A*), using three to each sheet, two on the long side and one on the short side. Two 1-inch barbed wire nails to each cleat. If the tin is put on in rolls the sheets should be made up into long lengths in the shop, the cross seams locked together and well soaked with solder. The sheets should be edged  $\frac{1}{2}$  inch, fastened to the roof with cleats spaced 8 inches apart, cleats locked into the seam and fastened to the roof with two 1-inch barbed wire nails to each cleat. (*See Figs. B, C, D, and E.*)

### STANDING-SEAM TIN ROOFING

The sheets should be put together in long lengths in the shop, the cross seams locked together and well soaked with solder. The sheets should be applied to the roof the narrow way, fastened with cleats spaced one foot apart. One edge of



the course is turned up  $1\frac{1}{4}$  inches at a right angle, and the cleats are installed (see Fig. F). The adjoining edge of the next course is turned up  $1\frac{1}{2}$  inches, and these edges are locked together (see Fig. G), turned over (see Fig. H), and the seam flattened to a rounded edge, as shown in the accompanying illustrations (Figs. J and K).

## VALLEYS AND GUTTERS

These should be of IX tin, and formed with flat seams, applying the sheets the narrow way. It is important to see that good solder is used, bearing the manufacturer's name, and guaranteed one-half tin and one-half lead, new metals, using nothing but rosin as a flux. The solder should be well sweated into all seams and joints.

## PAINTING

All painting should be done by the roofer. The tin should be painted one coat on the under side before it is applied to the roof. The upper surface of the tin roof should be carefully cleaned of all rosin spots, dirt, etc., and immediately painted. The approved paints are metallic brown, Venetian red, red oxide, and red lead, mixed with pure linseed oil. No patent dryer or turpentine to be used. All coats of paint should be applied with a hand-brush, and well rubbed on. Apply a second coat two weeks after the first. The third coat to be applied one year later.

## CAUTION

No unnecessary walking over the tin roof, or using the same for storage of materials, should be allowed at any time. Workmen should wear rubber-soled shoes or overshoes when on the roof. Wherever the slope is steep enough, tin should be laid with standing seams, which allow for expansion and contraction.

## MAINTENANCE

To keep the roof in good condition subsequent painting will hardly be necessary at shorter intervals than three to five years' time, even longer, depending upon the slope of the roof and upon local conditions.

Since gutters are the natural receptacle for dirt, leaves, etc., they should be swept out and painted every two or three years.

Look over the roof carefully when painting it, to locate and repair any accidental damage.



# How a Tin Roof Should be Laid

Illustration 61. *Fig. A*

**TIN ROOFING CLEAT.** Used for fastening the sheets to the roof boards. See page 49 and following illustrations.

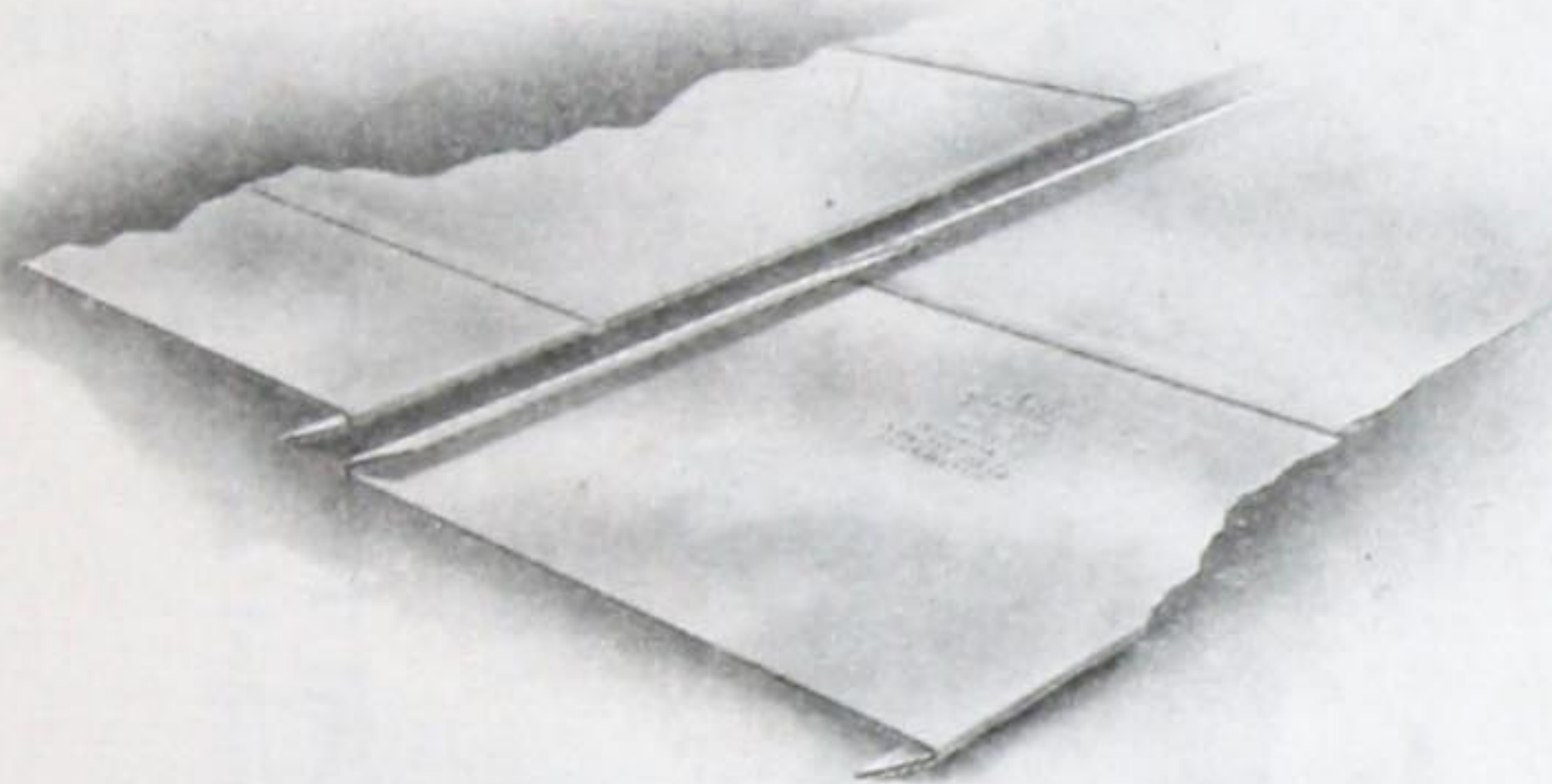
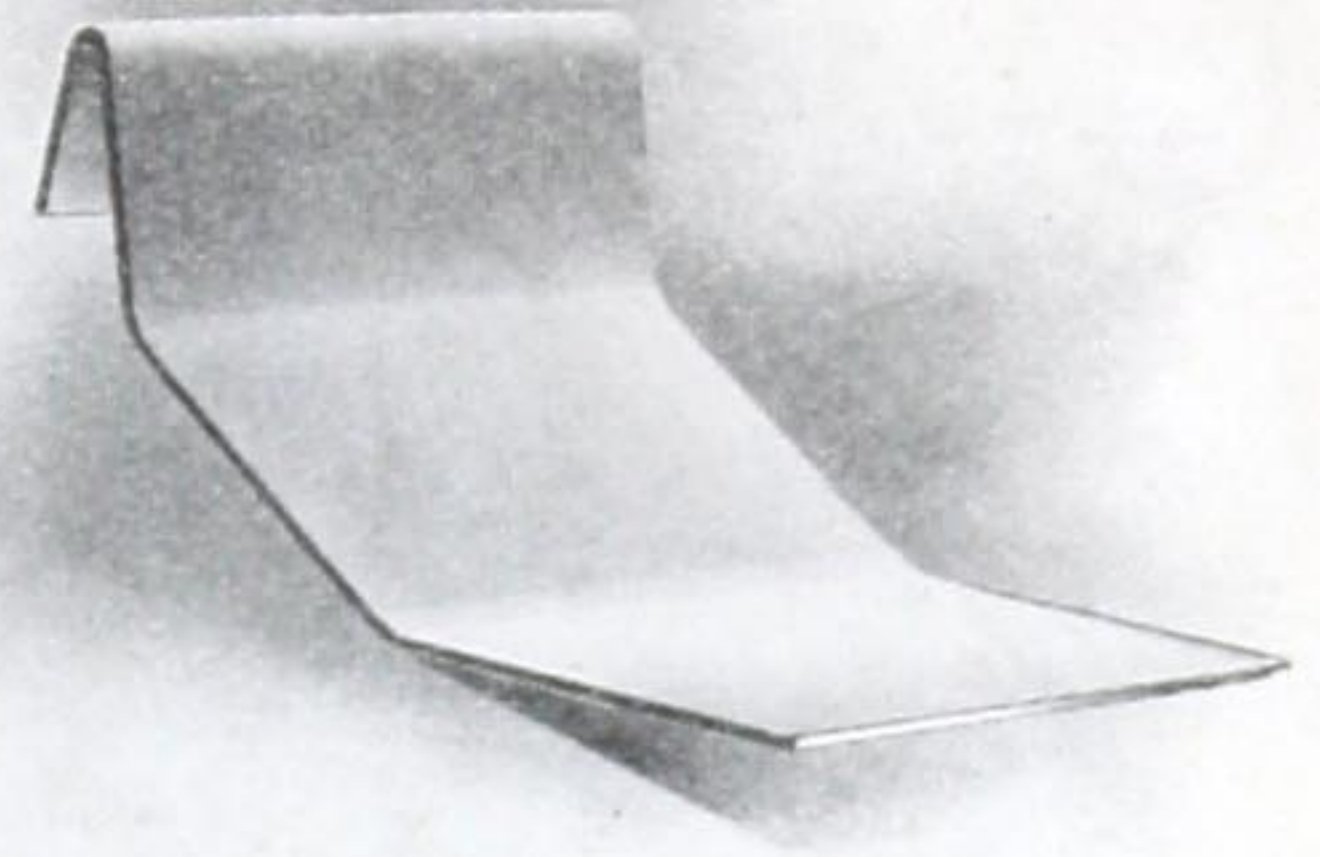


Illustration 62. *Fig. B*

**FLAT-SEAM TIN ROOFING.** Sheets of tin put together in long lengths, with edges turned, ready to lay on the roof.

Illustration 63. *Fig. C*

**FLAT-SEAM TIN ROOFING.** Showing method of fastening the tin to the roof. Cleat in position. The adjoining sheet is hooked over this, and the seam hammered down and soldered, locking the cleat firmly into the seam. One end of the cleat is turned over the nail-heads, to prevent them from scratching the under side of the tin.

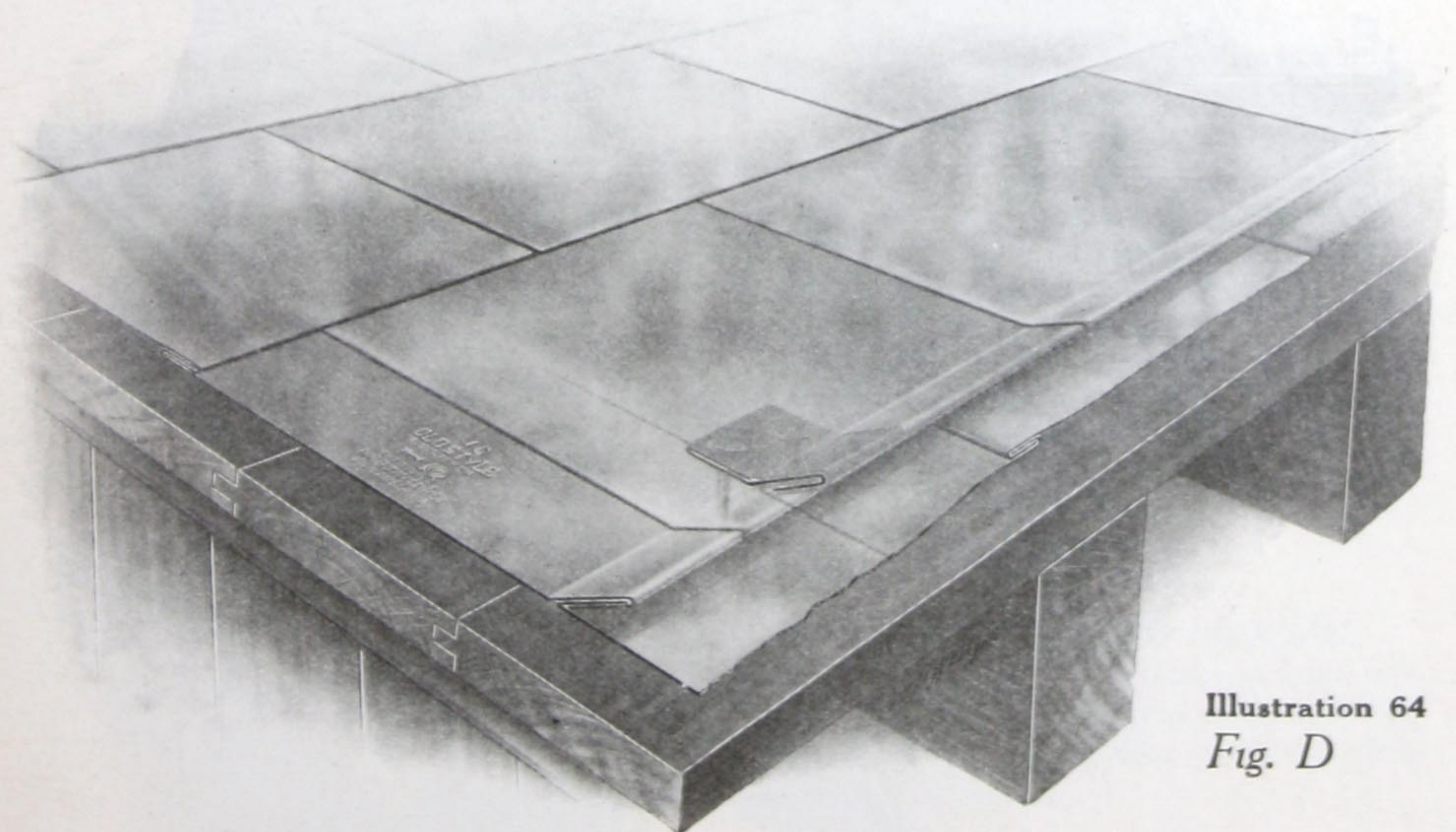
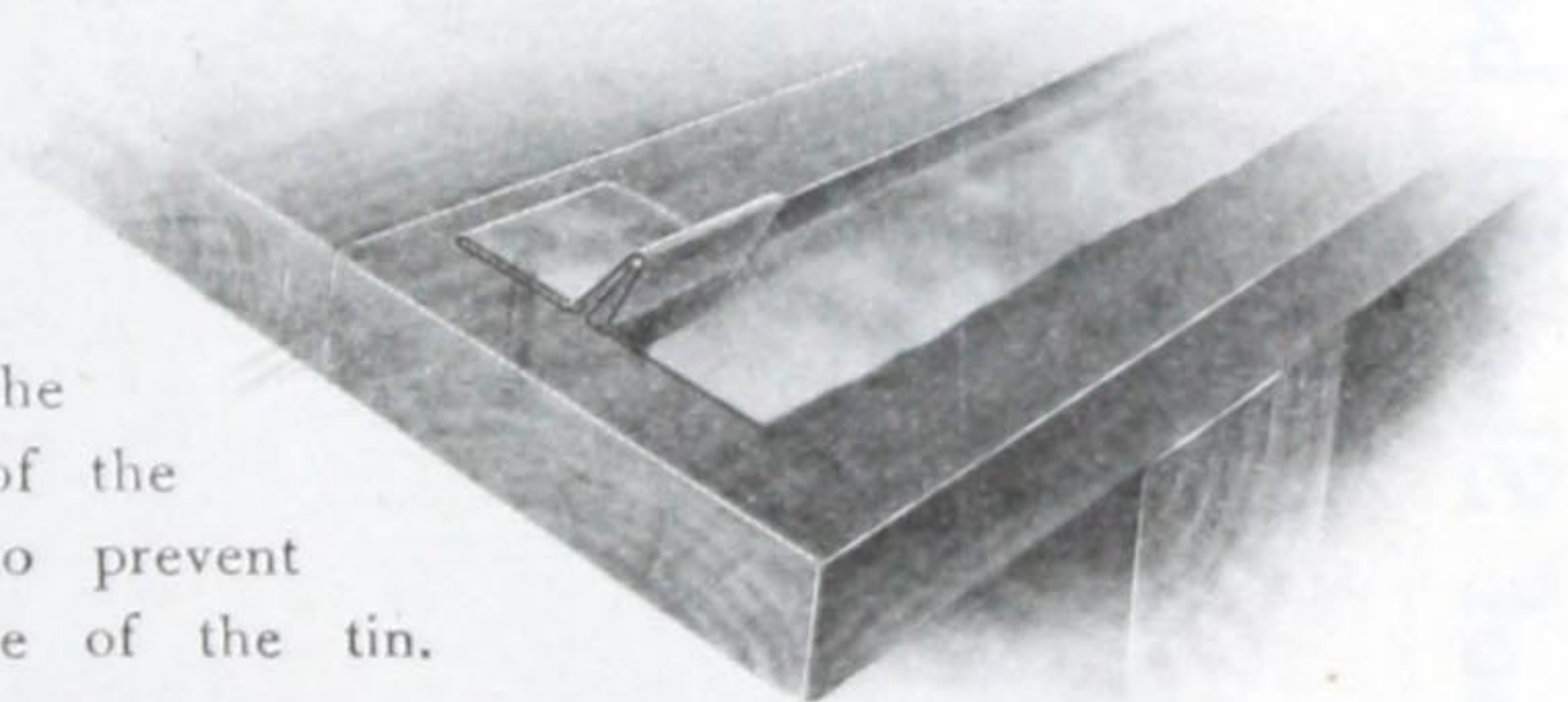


Illustration 64  
*Fig. D*

**FLAT-SEAM TIN ROOFING.** Showing the sheets in position before seam is hammered down and soldered. One cleat also shown (magnified), with faint lines indicating the various folds of tin in the seam.



## How a Tin Roof Should be Laid

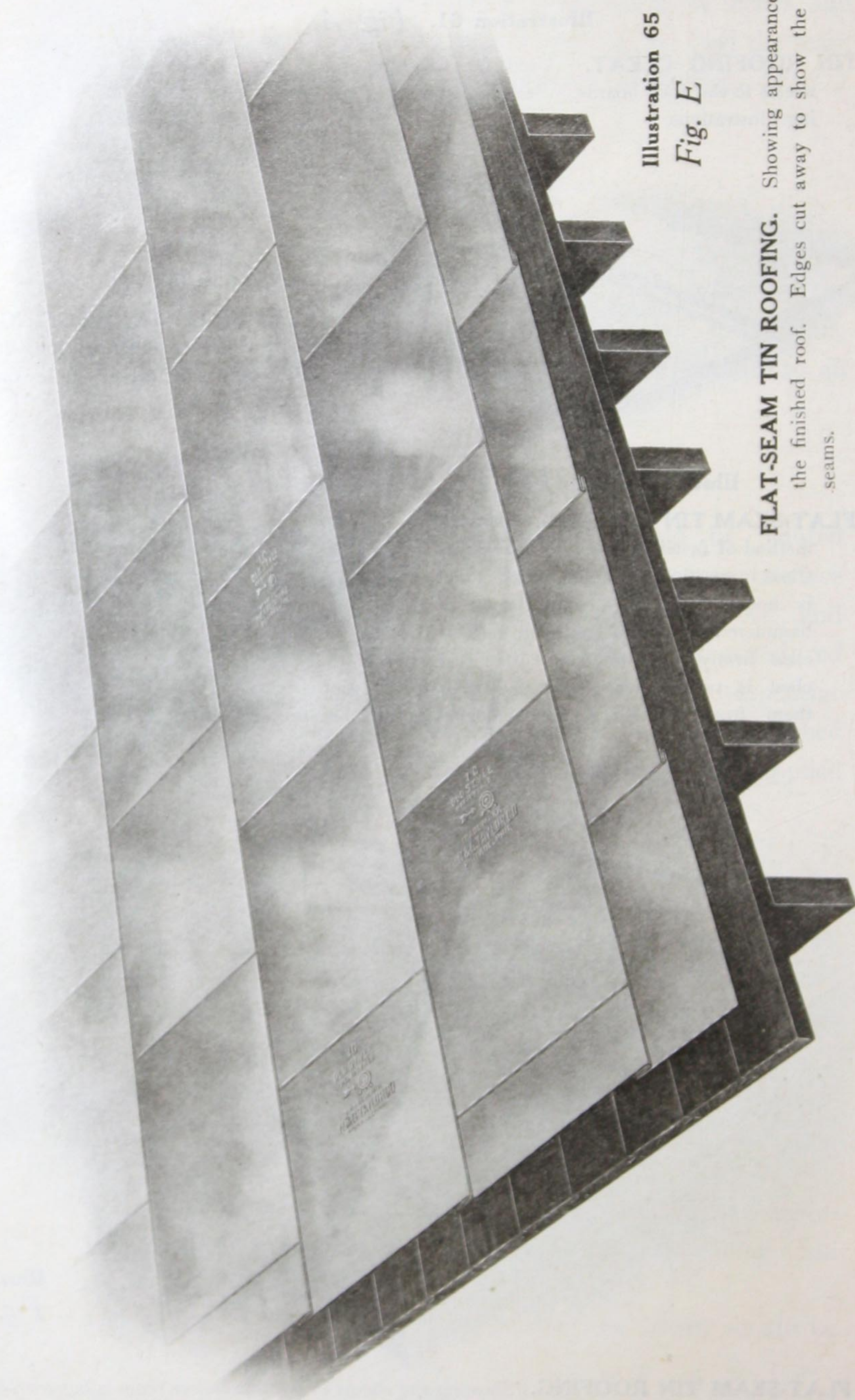


Illustration 65

Fig. E

**FLAT-SEAM TIN ROOFING.** Showing appearance of the finished roof. Edges cut away to show the flat seams.



## How a Tin Roof Should be Laid

Illustration 66. *Fig. F*

### STANDING-SEAM TIN ROOFING.

First operation, showing adjoining sheets turned up at right angles, with cleat installed.

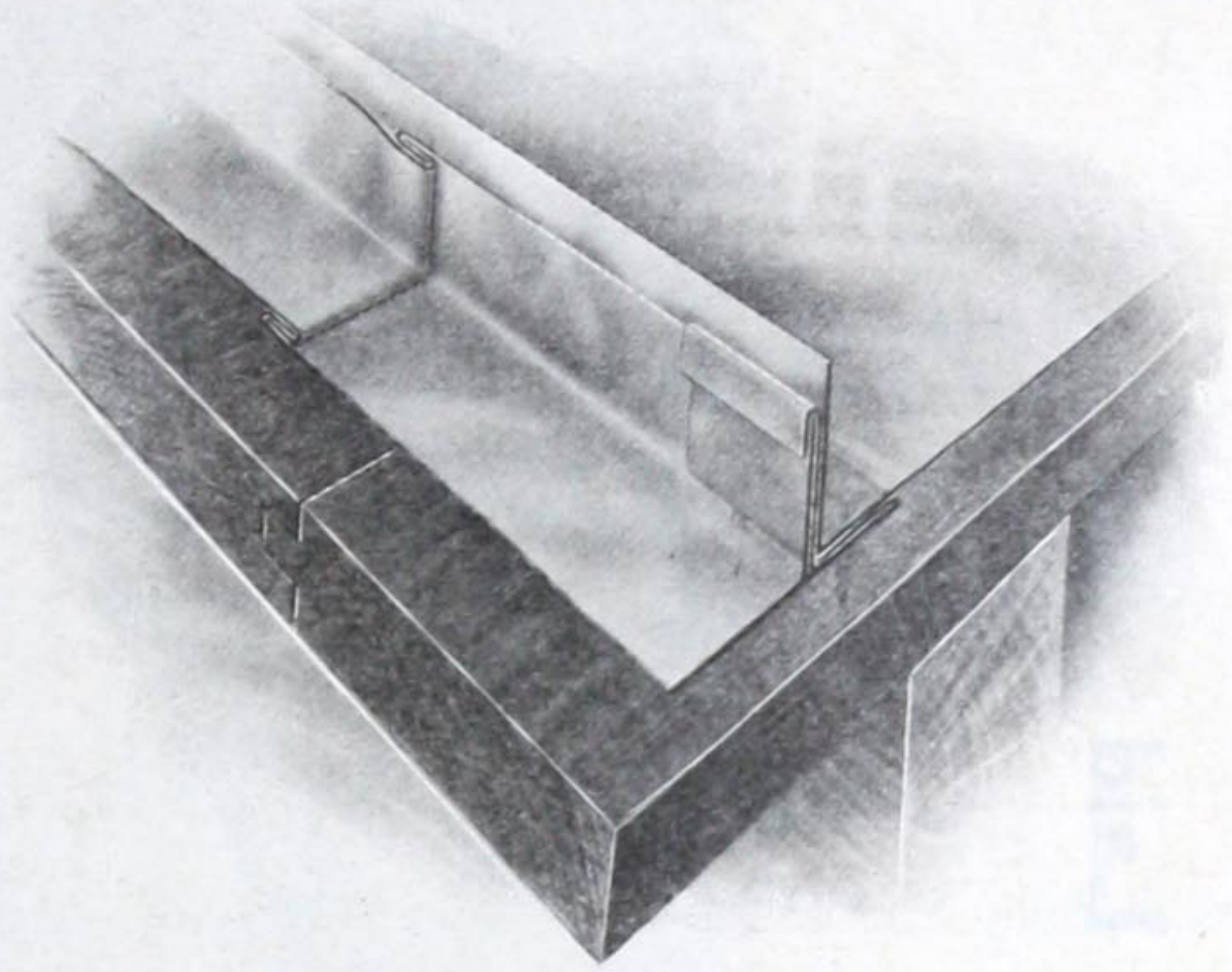


Illustration 67. *Fig. G*

### STANDING-SEAM TIN ROOFING.

Second operation. Projecting edge turned over.

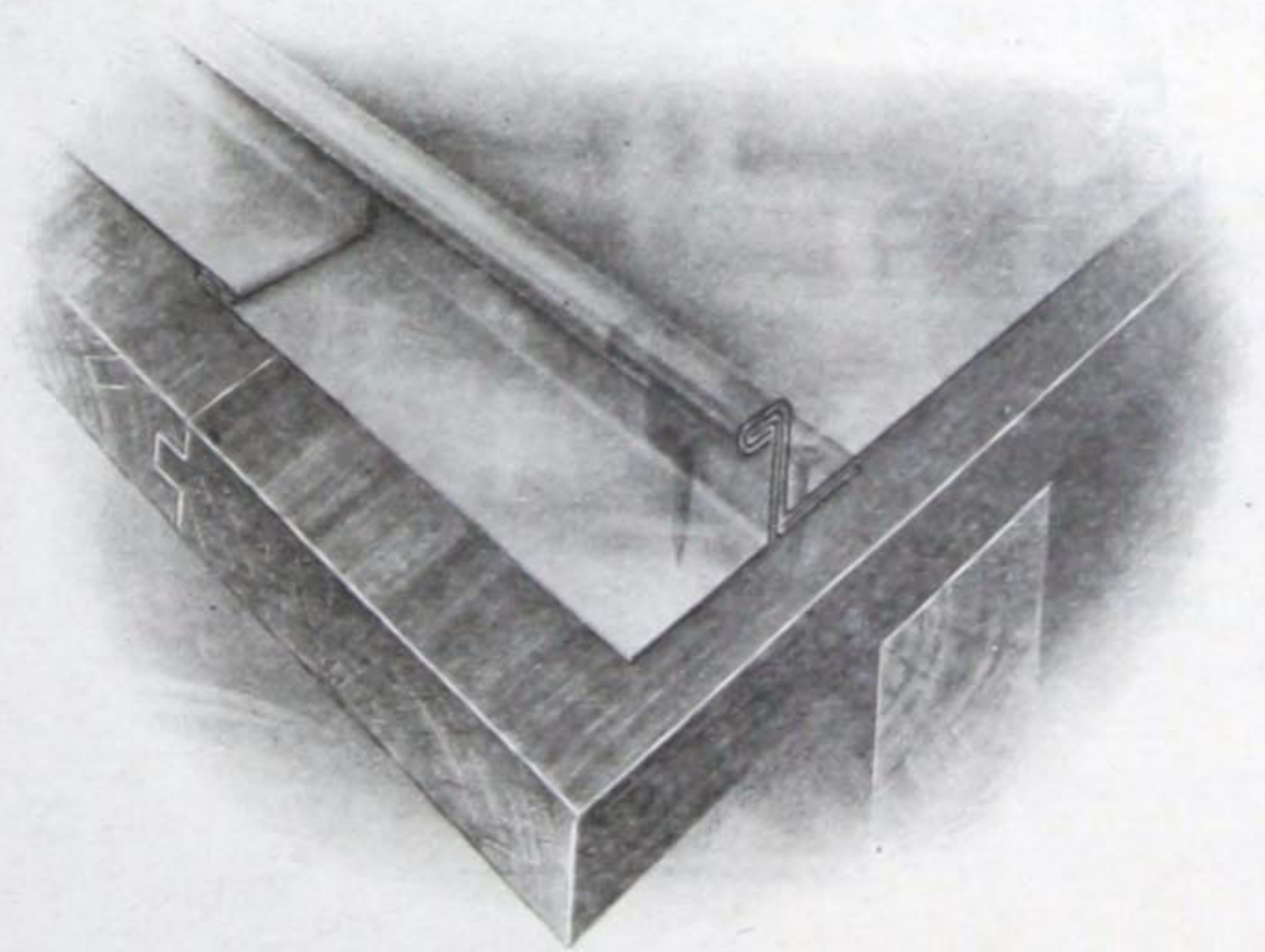
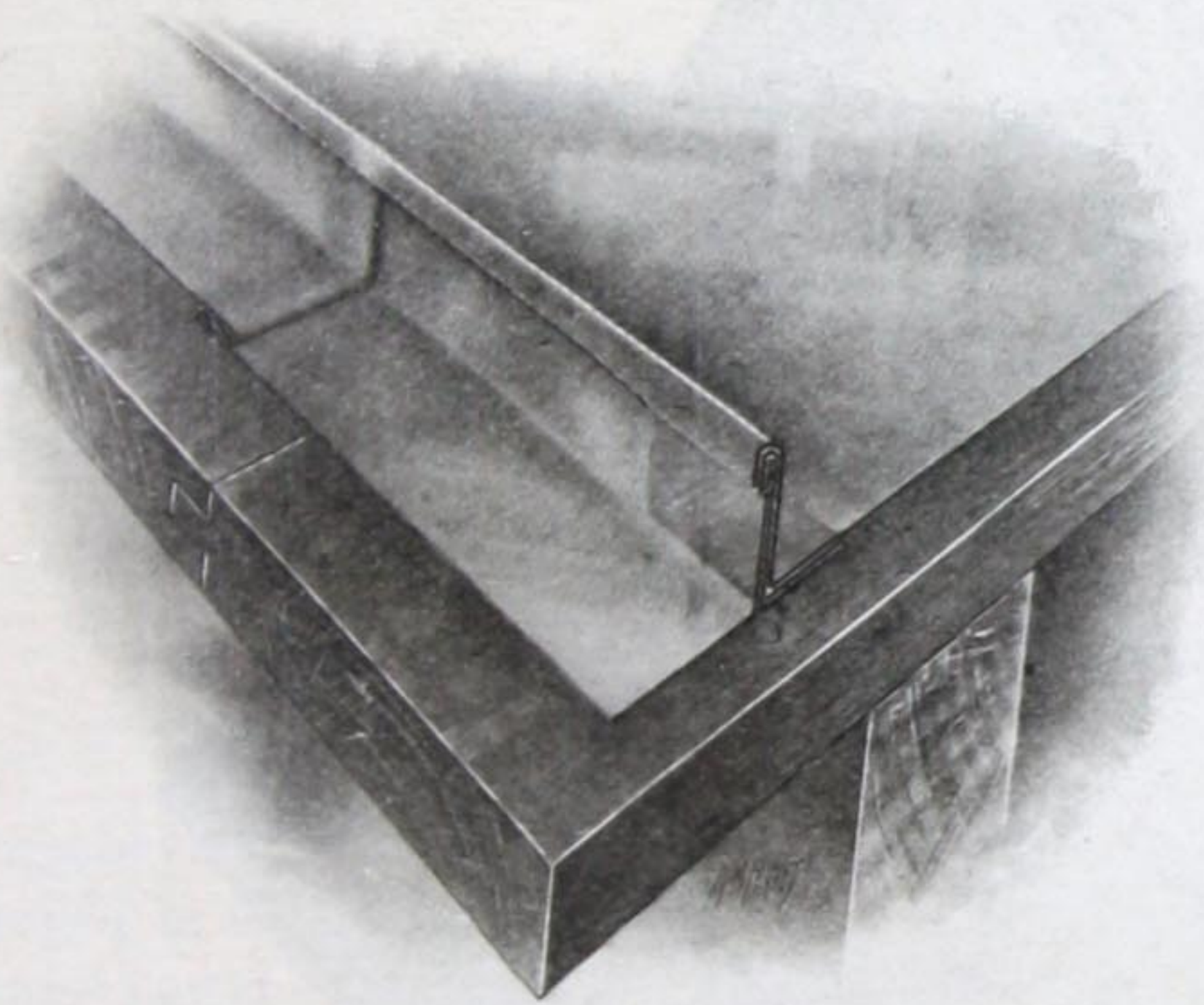


Illustration 68. *Fig. H*

### STANDING-SEAM TIN ROOFING.

Third operation. Entire seam turned partly over.

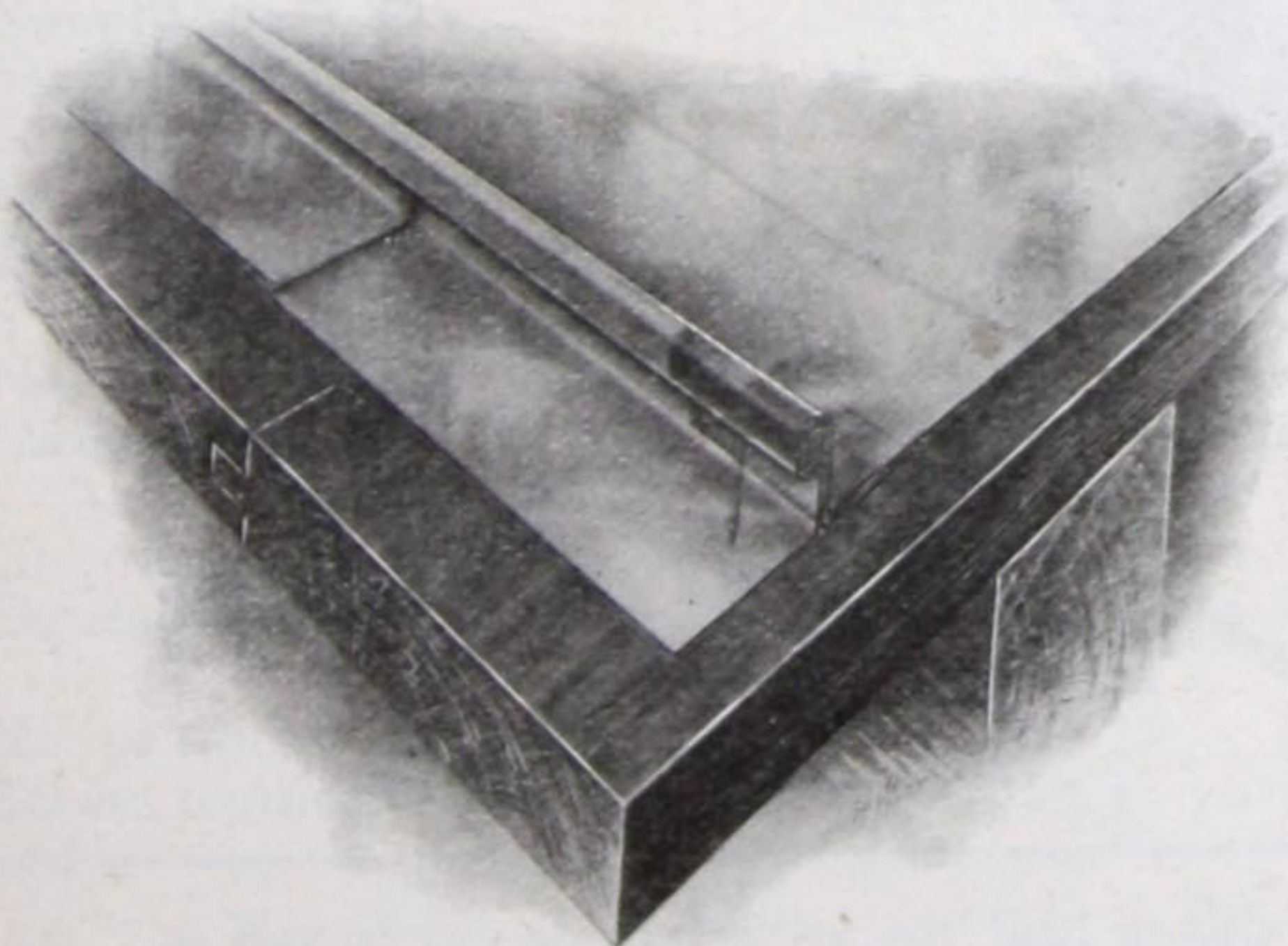


Illustration 69. *Fig. J*

### STANDING-SEAM TIN ROOFING.

Fourth operation. Standing seam completed, showing cleat in position. Thickness of seam magnified, to show the folds of the metal.



## How a Tin Roof Should be Laid

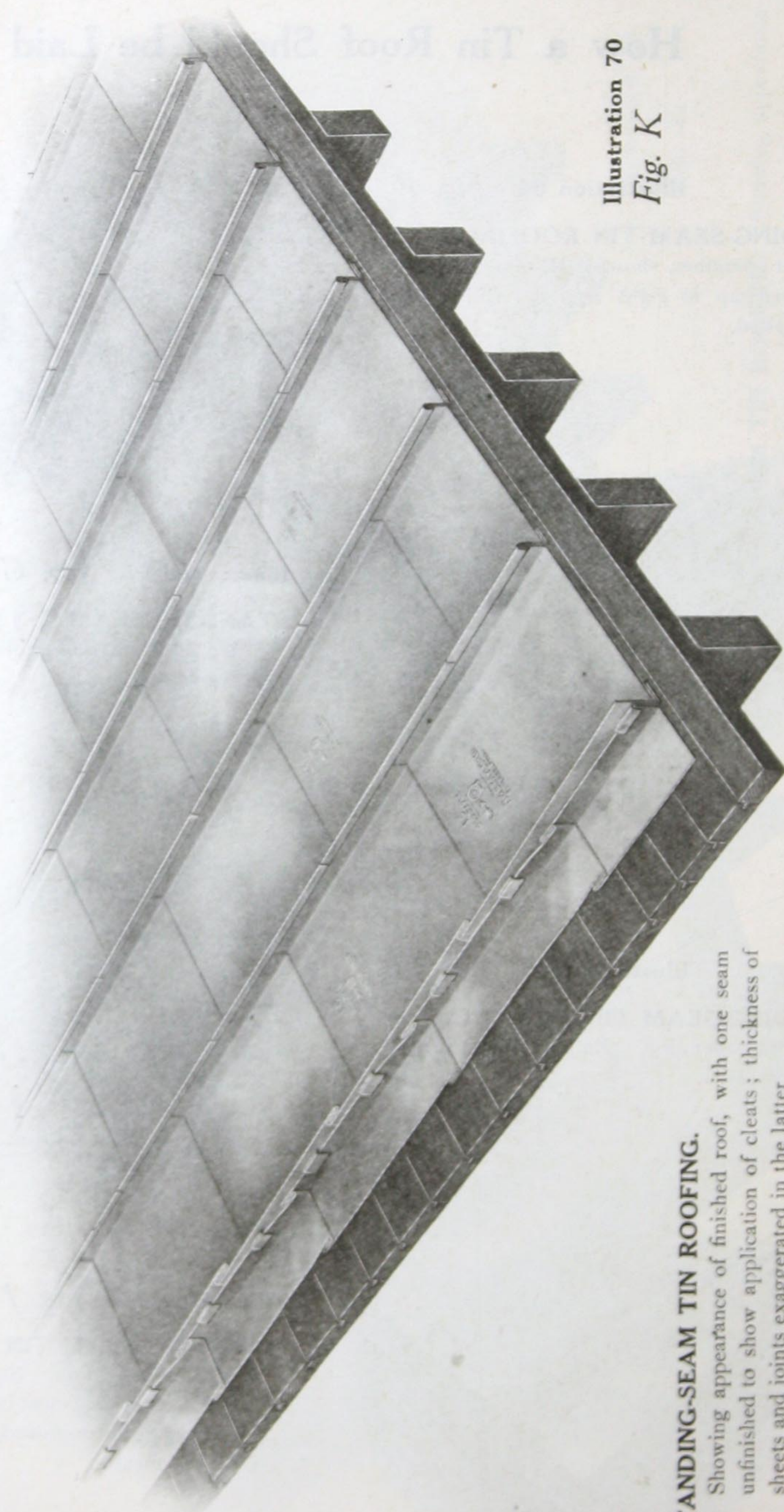


Illustration 70  
*Fig. K*

### STANDING-SEAM TIN ROOFING.

Showing appearance of finished roof, with one seam unfinished to show application of cleats; thickness of sheets and joints exaggerated in the latter



ROOFING TIN TABLES

WEIGHTS, TRADE TERMS, ETC.  
FOR USE IN ESTIMATING

SIZES, WEIGHTS, ETC.

Roofing tin is usually furnished in two sizes, sheets 14" x 20" and 28" x 20", packed 112 sheets to the box.

"TARGET-AND-ARROW" tin is furnished in three thicknesses, IC thickness (approx. 30 gauge U. S. St'd). IX thickness (approx. 28 gauge U. S. St'd). 2X thickness (approx. 27 gauge U. S. St'd), etc. Weight per 100 sq. ft. laid on the roof, about 65 lb. for IC thickness.

COVERING CAPACITY

**Flat Seam Tin Roofing.**—Table showing quantity of 14" x 20" tin required to cover a given number of square feet with flat-seam tin roofing. A sheet of 14" x 20" with 1/2" edges measures, when edged or folded, 13" x 19" or 247 square inches, but its covering capacity when joined to other sheets on the roof is only 12 1/2" x 18 1/2", or 231.25 square inches. In the following all fractional parts of a sheet are counted a full sheet.

No. of square feet.....	100	110	120	130	140	150	160	170	180	190	200
Sheets required.....	63	69	75	81	88	94	100	106	112	119	125
No. of square feet.....	210	220	230	240	250	260	270	280	290	300	310
Sheets required.....	131	137	144	150	156	162	169	175	181	187	193
No. of square feet.....	320	330	340	350	360	370	380	390	400	410	420
Sheets required.....	200	206	212	218	224	231	237	243	249	256	262
No. of square feet.....	430	440	450	460	470	480	490	500	510	520	530
Sheets required.....	268	274	281	287	293	299	305	312	318	324	330
No. of square feet.....	540	550	560	570	580	590	600	610	620	630	640
Sheets required.....	337	343	349	355	362	368	374	380	386	393	399
No. of square feet.....	650	660	670	680	690	700	710	720	730	740	750
Sheets required.....	405	411	418	424	430	436	442	448	455	461	467
No. of square feet.....	760	770	780	790	800	810	820	830	840	850	860
Sheets required.....	474	480	486	492	499	505	511	517	523	530	536
No. of square feet.....	870	880	890	900	910	920	930	940	950	960	970
Sheets required.....	542	548	554	561	567	573	579	586	592	598	604
No. of square feet.....	980	990									
Sheets required.....	610	617									

A box of 112 sheets 14" x 20" laid in this way will cover 180 square feet.



COVERING CAPACITY—(Continued)

**Flat Seam Tin Roofing.**—Table showing number of 28" x 20" sheets required to cover a given number of square feet with flat-seam roofing. The flat seams edged  $\frac{1}{2}$ " take  $1\frac{1}{2}$ " off the length and width of the sheet. The covering capacity of each sheet is therefore  $26\frac{1}{2}$  x  $18\frac{1}{2}$ , or 490.25 sq. in.

No. of square feet.....	100	110	120	130	140	150	160	170	180	190	200
Sheets required.....	30	33	36	39	42	45	47	50	53	56	59
No. of square feet.....	210	220	230	240	250	260	270	280	290	300	310
Sheets required.....	62	65	68	71	74	77	80	83	86	89	92
No. of square feet.....	320	330	340	350	360	370	380	390	400	410	420
Sheets required.....	94	97	100	103	106	109	112	115	118	121	124
No. of square feet.....	430	440	450	460	470	480	490	500	510	520	530
Sheets required.....	127	130	133	136	139	141	141	147	150	153	156
No. of square feet.....	540	550	560	570	580	590	600	610	620	630	640
Sheets required.....	159	162	165	168	171	174	177	180	183	186	188
No. of square feet.....	650	660	670	680	690	700	710	720	730	740	750
Sheets required.....	191	194	197	200	203	206	209	212	215	218	221
No. of square feet.....	760	770	780	790	800	810	820	830	840	850	860
Sheets required.....	224	227	230	233	235	238	241	244	247	250	253
No. of square feet.....	870	880	890	900	910	920	930	940	950	960	970
Sheets required.....	256	259	262	265	268	271	274	277	280	282	285
No. of square feet.....	980	990	1000								
Sheets required.....	288	291	294								

A box of 112 sheets 28" x 20" laid in this way will cover 381 sq. ft.

**Standing-seam Tin Roofing.**—Table showing number of 14" x 20" sheets required to cover a given number of sq. ft. with standing-seam roofing. The standing seams edged  $1\frac{1}{4}$ " and  $1\frac{1}{2}$ " take  $2\frac{3}{4}$ " off the width; and the flat cross seams, edged  $\frac{3}{8}$ " take  $1\frac{1}{8}$ " off the length of the sheet. The covering capacity of each sheet is, therefore,  $11\frac{1}{4}$  x  $18\frac{7}{8}$ , or 212.34 sq. in. In these tables fractional parts have been counted as a full sheet.

No. of square feet.....	100	110	120	130	140	150	160	170	180	190	200
Sheets required.....	68	75	82	89	95	102	109	116	123	129	136
No. of square feet.....	210	220	230	240	250	260	270	280	290	300	310
Sheets required.....	143	150	156	163	170	177	184	190	197	204	211
No. of square feet.....	320	330	340	350	360	370	380	390	400	410	420
Sheets required.....	218	224	231	238	245	251	258	265	271	279	285
No. of square feet.....	430	440	450	460	470	480	490	500	510	520	530
Sheets required.....	292	299	306	312	319	326	333	340	346	353	360
No. of square feet.....	540	550	560	570	580	590	600	610	620	630	640
Sheets required.....	367	374	379	387	393	401	407	414	421	428	435
No. of square feet.....	650	660	670	680	690	700	710	720	730	740	750
Sheets required.....	441	447	455	462	468	475	482	489	495	501	509
No. of square feet.....	760	770	780	790	800	810	820	830	840	850	860
Sheets required.....	515	523	529	536	543	550	557	563	570	577	584
No. of square feet.....	870	880	890	900	910	920	930	940	950	960	970
Sheets required.....	590	597	604	611	618	623	630	637	644	651	658
No. of square feet.....	980	990	1000								
Sheets required.....	665	672	679								

A box of 112 sheets 14" x 20" laid in this way will cover 165 sq. ft.



**COVERING CAPACITY—(Continued)**

**Standing-seam Tin Roofing.**—Table showing number of 28" x 20" sheets required to cover a given number of sq. ft. with standing seam roofing.

The standing seams take  $2\frac{3}{4}$ " off the width, and the flat cross seams (edged  $\frac{3}{8}$ ") take  $1\frac{1}{8}$ " off the length of the sheet. The **covering capacity** of each sheet is, therefore,  $25\frac{1}{4}$ " x  $18\frac{7}{8}$ ", or 463.6 sq. in.

In these tables fractional parts have been counted as a full sheet.

No. of square feet.....	100	110	120	130	140	150	160	170	180	190	200
Sheets required.....	32	35	38	41	44	47	50	53	56	59	62
No. of square feet.....	210	220	230	240	250	260	270	280	290	300	310
Sheets required.....	65	68	71	74	77	80	84	87	90	94	97
No. of square feet.....	320	330	340	350	360	370	380	390	400	410	420
Sheets required.....	100	103	106	109	112	115	118	121	125	128	131
No. of square feet.....	430	440	450	460	470	480	490	500	510	520	530
Sheets required.....	134	137	141	144	147	150	153	156	159	162	165
No. of square feet.....	540	550	560	570	580	590	600	610	620	630	640
Sheets required.....	168	171	174	177	180	184	187	190	193	196	199
No. of square feet.....	650	660	670	680	690	700	710	720	730	740	750
Sheets required.....	202	205	208	211	214	218	221	224	227	230	233
No. of square feet.....	760	770	780	790	800	810	820	830	840	850	860
Sheets required.....	236	239	242	245	249	252	255	258	261	265	268
No. of square feet.....	870	880	890	900	910	920	930	940	950	960	970
Sheets required.....	271	274	277	280	283	286	289	292	296	299	302
No. of square feet.....	980	990									
Sheets required.....	305	308									

A box, 112 sheets, 28" x 20", will cover 360 square feet.

Sheets 14" x 20" can be laid either the long or short way. The best roof is made by laying the sheets the 14" way; similarly, in laying 28" x 20", always lay the 20" way, *i. e.*, the short dimension crosswise.

**COST**

**Cost of Tin for Standing Seam Roofing.**—Size sheets, 28" x 20". Price per box and per square foot.

When tin costs per box.....	\$6.00	\$6.50	\$7.00	\$7.50	\$8.00	\$8.50	\$9.00	\$9.50	\$10.00	\$10.50
S. S. Roofing costs per sq. ft..	.0162	.0175	.0189	.0202	.0216	.0230	.0243	.0256	.0270	.0283
When tin costs per box.....	11.00	11.50	12.00	12.50	13.00	13.50	14.00	14.50	15.00	15.50
S. S. Roofing costs per sq. ft....	.0297	.0310	.0324	.0337	.0351	.0364	.0378	.0391	.0404	.0418
When tin costs per box.....	16.00	16.50	17.00	17.50	18.00	18.50	19.00	19.50	20.00	20.50
S. S. Roofing costs per sq. ft..	.0432	.0446	.0459	.0473	.0486	.0500	.0513	.0526	.0540	.0553
When tin costs per box.....	21.00	21.50	22.00	22.50	23.00	23.50	24.00	24.50	25.00	
S. S. Roofing costs per sq. ft..	.0567	.0580	.0594	.0607	.0621	.0634	.0648	.0661	.0675	

The above estimates do not include cost of laying.

Cost, using 14" x 20" sheets, will amount to about twenty-five per cent. more than the cost using 28" x 20" size, owing to the greater number of seams, hence more tin, solder, cleats, and work are necessary.



TIN IN ROLLS

For the convenience of roofers and for rush orders, " TARGET-AND-ARROW " tin is put up in rolls 14", 20", or 28" wide. Each roll contains 108 sq. ft. (about 63 lineal feet, 28" x 20" sheets laid 20" wide). The tin is painted one side or both sides, as wanted, with good metallic brown paint. Seams are carefully soldered by hand, using good 100 to 100 solder and rosin as a flux.

TIN IN ROLLS, OR GUTTER STRIP

Number of sheets required per lineal foot for 20" and 28" widths.

Feet	WIDTH		Feet	WIDTH		Feet	WIDTH		Hundred Feet	WIDTH	
	20	28		20	28		20	28		20	28
1	1	1	35	16	23	69	31	44	2	89	128
2	1	2	36	16	23	70	32	45	3	134	192
3	2	2	37	17	24	71	32	45	4	178	256
4	2	3	38	17	24	72	32	46	5	223	320
5	3	4	39	18	25	73	33	47	6	267	384
6	3	4	40	18	26	74	33	47	7	312	444
7	4	5	41	19	27	75	34	48	8	356	512
8	4	5	42	19	27	76	34	48	9	401	576
9	4	6	43	20	28	77	35	49	10	445	640
10	5	7	44	20	28	78	35	50	11	495	704
11	5	7	45	20	29	79	36	50	12	540	768
12	6	8	46	21	29	80	36	51	13	585	832
13	6	9	47	21	30	81	36	52	14	630	896
14	7	9	48	22	31	82	37	52	15	675	960
15	7	10	49	22	31	83	37	53	16	720	1024
16	8	11	50	23	32	84	38	54	17	765	1088
17	8	11	51	23	33	85	38	54	18	810	1152
18	8	12	52	24	33	86	39	55	19	855	1216
19	9	12	53	24	34	87	39	55	20	900	1280
20	9	13	54	24	34	88	40	56	21	945	1344
21	10	14	55	25	35	89	40	57	22	990	1408
22	10	14	56	25	36	90	40	57	23	1035	1472
23	11	15	57	26	36	91	41	58	24	1080	1536
24	11	16	58	26	37	92	41	59	25	1135	1600
25	12	16	59	27	38	93	42	59	26	1170	1664
26	12	17	60	27	38	94	42	60	27	1215	1738
27	12	18	61	28	39	95	43	61	28	1260	1792
28	13	18	62	28	40	96	43	62	29	1305	1856
29	13	19	63	28	40	97	44	62	30	1350	1920
30	14	19	64	29	41	98	44	63	31	1395	1984
31	14	20	65	29	41	99	44	64	32	1440	2048
32	15	21	66	30	42	100	45	64	33	1485	2112
33	15	21	67	30	43				34	1530	2176
34	16	22	68	31	43				35	1575	2240





### NEW MASONIC TEMPLE, WASHINGTON, D. C.

Roofed with Target-and-Arrow tin. On the visible parts of the roof the tin is laid over wooden strips, to get the desired ribbed effect, as clearly shown in the photograph.

*Wood, Donn & Deming, Architects, Washington, D. C.*

*Warren M. Whyte, Roofer, Washington, D. C.*





QUEEN ANNE HIGH SCHOOL, SEATTLE, WASH.

Roofed in 1909 with more than 40,000 sq. ft. of Target-and-Arrow tin.

*James Stephen, Architect, Seattle, Wash.*

*Roofing Work by Seattle Cornice Works, Seattle, Wash.*



PAINTING

One gallon of good paint (metallic brown, Venetian red, or red oxide, with pure linseed oil) will cover about 400 sq. ft. of surface, one coat. To keep tin roofs in perfect condition paint at intervals of three to five years, or longer as the roof ages and the paint skin thickens.

ROOFING WEIGHTS

Weights of Various Roofing Materials Per Square (100 sq. ft. on the roof). Sheathing-boards not included.

Tiles (shingle) 10½ x 6¼" x ½"—5¼" to weather.....	1800 lb.
Tiles (Spanish) 14½" x 10½"—7¼" to weather .....	850 lb.
Slate, ⅜", good grade .....	650 to 700 lb.
Five-ply gravel.....	600 to 650 lb.
Four-ply slag.....	525 to 575 lb.
Three-ply slag.....	350 to 450 lb.
Shingles, spruce and pine.....	400 lb.
Corrugated, galvanized iron, No. 20 gauge.....	225 lb.
Copper, 16-oz., standing seam .....	125 lb.
Tin, IC thickness, standing seam.....	65 lb.

WEIGHT OF SHEATHING-BOARDS

Yellow pine sheathing 1" thick, 400 lb. White pine, or spruce sheathing 1" thick, 250 lb. Hemlock sheathing 1" thick, 200 lb.

SNOW LOAD

When the slope of a roof has over 12" rise per foot of horizontal run, a snow and accidental load of 8 lb. per square foot is ample allowance. When the slope is under 12" rise per foot of run, a snow and accidental load of 12 lb. per square foot should be provided for. The snow load acts vertically and therefore should be added to the dead load in designing roof trusses. The snow load may be included when a high wind pressure has been considered, as a great wind storm would very likely remove all the snow from the roof.

WIND PRESSURE

The following table gives the pressure exerted upon roofs of different slopes by a wind pressure of 40 lb. per square foot on a vertical plane, equivalent to a violent hurricane with a velocity of nearly one hundred miles per hour.

Wind Pressure on Roofs. (Pounds per Square Foot.)

Rise Inches per foot of Run....	4	6	8	12	16	18	24
Angle with Horizontal.....	18° 25'	26° 33'	33° 41'	45° 0'	53° 7'	56° 20'	63° 27'
Pitch Proportion of rise to Span..	$\frac{1}{6}$	$\frac{1}{4}$	$\frac{1}{3}$	$\frac{1}{2}$	$\frac{2}{3}$	$\frac{3}{4}$	1
Wind Pressure Normal to Slope..	16.8	23.7	29.1	36.1	38.7	39.3	40.0

We send copies of the following books on request free of charge: "Tin Roofers' Handbook," "A Guide to Good Roofs," "Terne and Tin Plate," and other literature useful to the roofer in talking good tin roofs. We also send free to roofers "TARGET-AND-ARROW" building signs, 5 x 2 feet, with your name and address printed on them in large type.



## HOW ROOFING TIN IS MADE

Roofing tin or terne plate is made by applying as a coating an alloy of tin and lead to sheets of iron or steel.

The black sheets (or black plate) are rolled from thin, flat bars of soft steel or iron, known as "tin-bars" or "sheet-bars." This step in the process is known as "hot-rolling" and the stands of rolls, the "hot mills."

Coming from the hot rolls the unfinished black plates are sheared to size, and are then pickled in dilute sulphuric acid, to remove any scale or dirt, being held loosely in racks or cradles, so that the acid in the pickling vats may penetrate between the sheets. The black plates are then washed with water (swilled) in tanks, to remove all traces of acid, and are then annealed, being placed in covered iron boxes to exclude the air, heated in a furnace to 1400° to 1600° Fahrenheit, for sixteen to twenty hours.

They are then allowed to cool gradually, and are "cold rolled," namely, given a number of passes through polished rolls under heavy pressure, to produce a perfectly smooth surface. As this makes them somewhat stiff, they are then re-annealed ("white-annealing" or second annealing) at a temperature higher than before.

The amount of cold-rolling, pickling, and annealing depends upon the character of the finished tinplate for which the sheets are intended.

Before tinning, the sheets are resquared, again pickled, known as the "white pickling" or second pickling, are thoroughly washed to remove all traces of acid, and kept under water until they are taken out to be run through the tinning process.

The common modern method of coating the sheets is performed in one operation by passing them through a pot of molten metal, between driven rollers arranged in pairs, the last set squeezing off the surplus metal. These mechanical tinning pots are sometimes called "patent stacks." There are several varieties in this country. All are modifications of the early method of tinning, which was done by hand, and was more complicated.

This old-time process, which we term "the full seven open-pot, palm-oil hand-dipping stack," now employed only at our Philadelphia Works, may be described briefly as follows: The sheets are taken from the water-bosh singly and placed on edge in the grease-pan, containing hot palm oil. After the sheets have soaked in the hot palm oil for about fifteen minutes the tin-man, with a heavy pair of tongs, takes as many as he can easily lift and deposits them in the next pot to his left, known as the "Tin Pot," and containing only hot metal. This "Tin Pot" is separated from the grease-pan by a partition which is about 2 inches higher than the oil in the grease-pan.

The oil in the grease-pan is heated by coming in direct contact with the hot metal in the tin pot, the tin-man at regular intervals ladling oil from the grease-pan into the tin pot.

The sheets are pushed well down into the molten metal in the tin pot and allowed to soak until thoroughly coated. The tin-man then, by means of tongs, lifts them from the tin pot and immerses them in the next pot to his left, known as the "Soak Pot," which also contains hot molten metal only.

The washman then, by means of tongs, lifts a number of sheets and places them on their side upon the "Hob"—a flat iron table to the left of the soak pot. They are then manipulated by the washman, and where necessary rubbed with a hemp brush; after which they are immersed, one sheet at a time, in the wash-pot, the next pot to the left, which also contains molten metal. From the wash-pot the washman immerses the sheet in the grease-pot, the next pot to the left. This grease-pot contains nothing but hot palm oil, and tends to distribute the metal coating evenly over the sheet.

From the grease-pot the "riser" places the sheet in the "drain pot," which is



the next pot to the left, containing neither metal nor oil, but upright bars between which the sheets are placed on edge to drain off the excess amount of palm oil.

When drained, the "lister" dips the sheets in the list-pot, the end pot on the left, about two inches deep, containing about one-half inch of hot metal. This pot is for the purpose of taking off the list edge on the sheet.

This method of tinning plates is used in the manufacture of both roofing tin and bright tin plate, but only a very small percentage of bright tin plates are made by this process, owing to the greater cost of manufacture, and time required.

This process has been developed through years of practice, and results have shown that it is unnecessary to look for anything better. It ensures the perfect amalgamation of the three metals, and by its slow methods allows the coating to penetrate thoroughly all the pores or uneven spots of the black plate.

Other manufacturers employ a variation of the process above described, involving the passage of the plates finally through a set of rolls for the purpose of reducing slightly the amount of coating on the sheets and producing a smoother surface. This is done at the expense of the durability of the plate.

In our process no rolls or machinery are used, and the rough, natural wearing surface of the plate is preserved.

In order to cheapen materially the cost of manufacture of roofing tin a quicker machine process has been developed, which not only increases the speed of production, but accomplishes this with a lower grade of labor, less amount of labor, and with less expensive flux—chloride of zinc. By the use of this powerful chemical flux it is not necessary to soak the black plate, as in the case where palm oil is used as a flux, hence a large saving in time is accomplished and less operators are needed. The labor is unskilled, hence much less expensive. The increase in speed of production widens the difference in cost. The cost of chloride of zinc is much less than the cost of palm oil—all tending to deteriorate the quality of the coated plates.

A large percentage of the roofing plates put on the market in recent years have been made by this quick labor-saving process. The only thing that can be said in its favor is its low cost of production. In this process the rolls of the tinning machine operate in a bath of metal, and the acid flux floats on top, the metal line never varying. The sheets are passed one at a time through the acid into the molten metal, where the sheet is caught by the rolls.

If it is desired to give the plates a greasy or palm-oil finish, they are carried by rolls through palm oil. If they are to be finished dry they simply pass through one or more sets of rolls in hot metal.

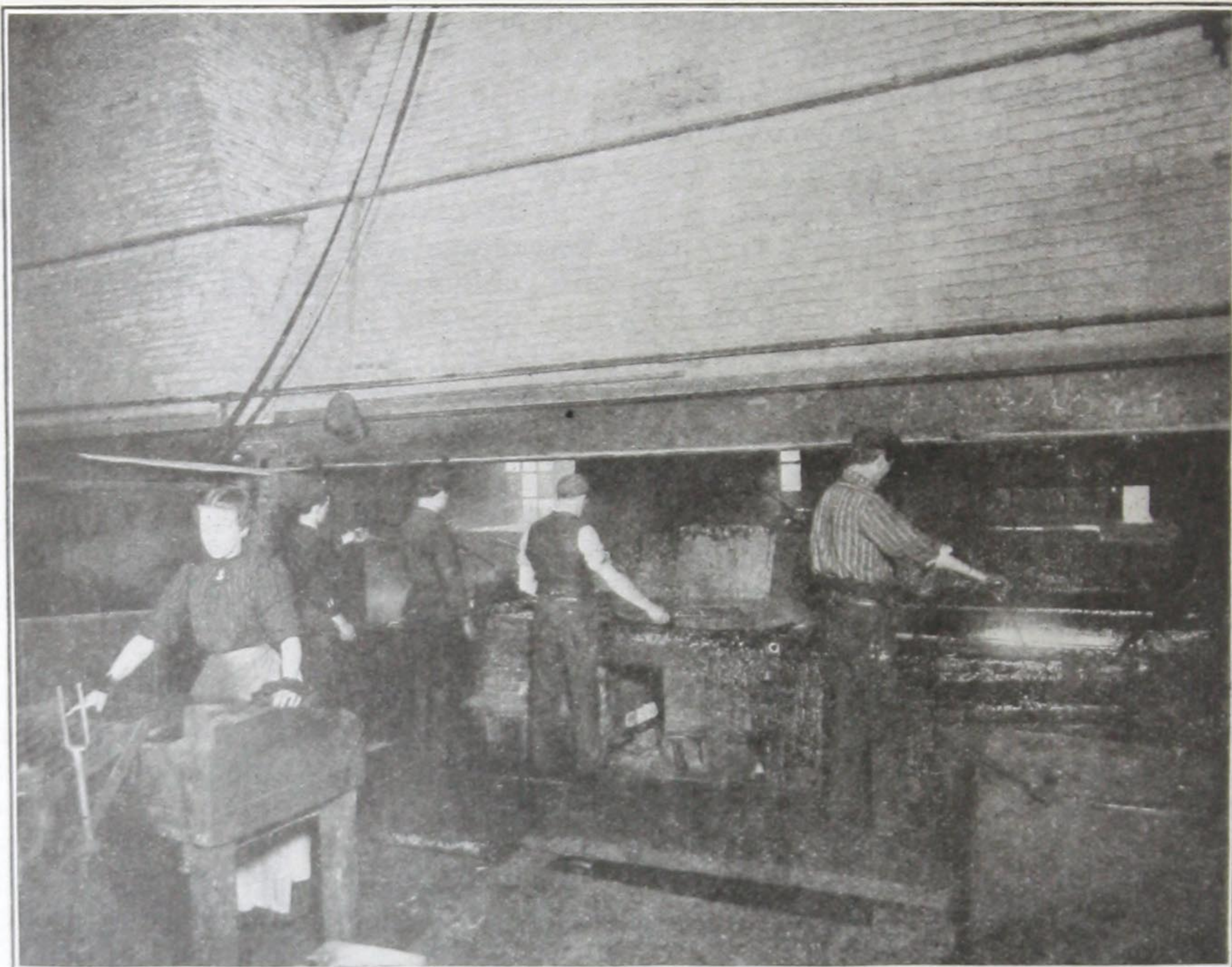
Sometimes sheets are made by passing through acid flux, coated by rolls, and finished by hand-dipping.

Then again we have combination stacks having hand-dipping beginnings with a machine finish. The product of these various combinations is often referred to as "palm-oil coated," or "hand-dipped," or "extra-coated plates." It is almost impossible for any but the expert to be certain of the process employed in coating the black plate unless he has seen the sheet coated, because the plate coated by acid flux can be finished in palm oil, giving the sheet the same greasy appearance as a sheet coated by palm oil as a flux.

In all these processes, after the sheets are coated and placed in racks to cool, the *terne* plates are cleaned by girls with sawdust and sheepskin or Canton flannel gloves. Cheap plates are taken from tinning machines and run through branners, or cleaning machines with a series of revolving brushes, rubbing bran or a mixture of sawdust and lime over the surface.

After cleaning, the plates are taken to the sorting rooms, where each separate sheet is examined. The perfect sheets, called "primes," are placed by themselves, while the imperfect sheets, or "wasters," are set aside. After the sheets are sorted the prime sheets are stamped with the name and trade-mark of the manufacturer, and are weighed and boxed ready for shipment.





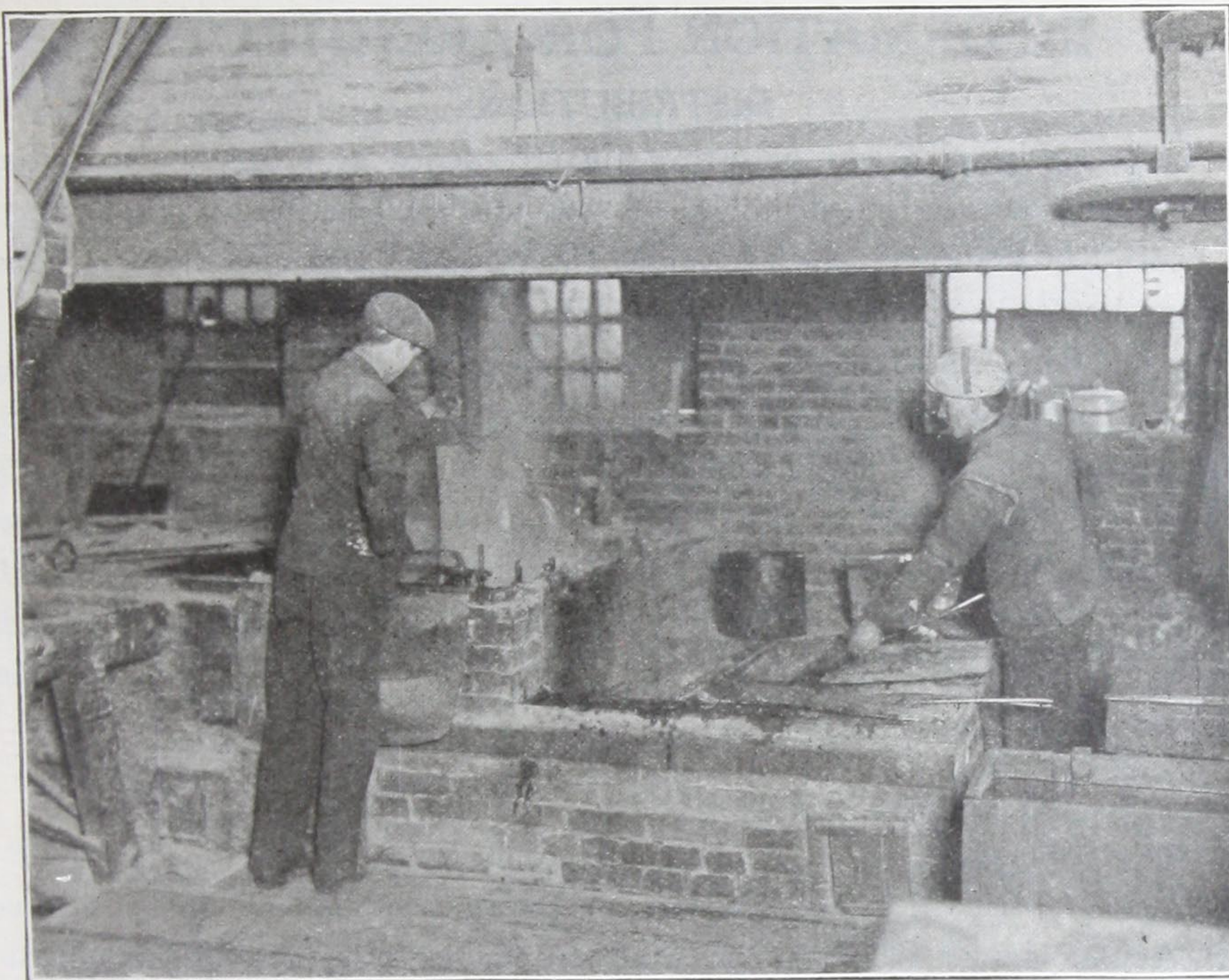
71. "FULL SEVEN OPEN-POT PALM-OIL HAND-DIPPING STACK," our exclusive process. Notice the absence of any rolls or machinery. The sheets are manipulated by these skilled operators, who transfer them from one pot to another, giving each step in the process ample time for completion—five skilled operators employed and thirty-five minutes required from the time the black sheet enters the first pot until it is taken from the last, heavily and thoroughly coated.

## A SHORT TALK ON OUR WAY OF MAKING ROOFING TIN

This is the old time, thorough method of coating the sheets by repeated dipping and soaking in several different pots and vats containing molten metal and palm oil, to pile on an exceptionally heavy, natural coating, or rather a series of coatings. This slow, tedious process has been employed only by us, for many years past, in making our highest grade of roofing tin. It has been called "the full seven open-pot, palm-oil, hand-dipping stack" (*see illustration No. 71*). It differs radically from the modern labor-saving way of making roofing tin by cheaper and quicker methods of production used at other works.

There is a great difference in durability between plates carrying 40-lb. coating applied by machinery, and 40-lb. coating applied by repeated hand-dipping, as many American roofers have found to their sorrow. The machine process gives the plates one dip; or if extra-coated or re-dipped plates are wanted, two dips (*see illustration No. 72*). The black sheets are carried into the tin bath and out again by means of rollers, which squeeze off a part of the coating, and mar the natural wearing surface of the plate. The process is quick, and a more powerful flux than the slow-acting





**72. PATENT TINNING STACK.** The modern way of making tinplate. In this process the coating is applied by machinery, the sheets being carried quickly through the tinning bath by means of revolving rolls. These rolls squeeze off a part of the coating and destroy the natural wearing surface of the plate. Barely twenty seconds are required to coat the sheet, and only two unskilled operators are needed to tend the machine—one to feed the sheets one by one through the rolls, and the other to catch them as they emerge, and transfer them to the cleaning machine. Powerful acid flux must be used in this quick process, instead of the mild, slow-acting palm oil. Plates can be made in this way to imitate the surface appearance of the hand-made product, but such plates do not compare with the old-time article for durability.

palm oil must be used, hence the general use of acid flux in making machine-made plates. Palm oil is sometimes used *after* the coating has been applied to give the surface a mottled or streaky appearance, and these are erroneously called "palm-oil plates."

In our process thorough "amalgamation" is assured between the black plate base and the tin coating, by reason of the length of time and the way the sheets are allowed to soak in the different baths of palm oil and metal. Thirty-five minutes are required to coat a sheet of our best tin. Commercial 40-lb. coated terne plates, showing a mottled surface, can be turned out by the machine process in *twenty-five seconds*. Five expert operators are required at each hand-dipping stack. The tinning machines, on the other hand, are operated by two persons, generally a man and a boy, both unskilled.

It is worth while for us to continue this old process of former years exactly as originally employed in our Welsh works, as our plates have an excellent reputation for durability, and command a price higher than the ordinary machine-made ternes.

It is worth your while to use them to make sure of satisfied patrons and a reputation for first-class work.



## INFORMATION FOR ARCHITECTS

### DISTRIBUTION

Large stocks of Target-and-Arrow tin are carried at principal distributing points throughout the United States as follows: Philadelphia, New York, Chicago, St. Louis, San Francisco, Omaha, Kansas City, Denver, Baltimore, New Orleans, Los Angeles, Portland, Seattle, Cumberland, Md.

In addition to these sources of supply, this popular brand is handled by leading wholesale hardware jobbers in all parts of the United States. No part of this country is far distant from a convenient source of supply. Other brands are known locally through certain prescribed districts. Target-and-Arrow tin has *national distribution*—an important feature for the architect whose work is not limited to a narrow field. For obvious reasons we do not publish the long list of jobbers who handle our brand, but shall be glad to post any architect on the nearest source of supply for work in any part of the United States.

### STANDARD TIN ROOFING SPECIFICATION

The following specification has been adapted for architects' use from the Standard Working Specifications of the National Association of Sheet Metal Contractors of the United States.\* This represents the best practice in laying tin roofs. Architects who have not already done so, will do well to incorporate this in their regular specification forms. Good workmanship and fair treatment are as necessary as good material to get satisfactory results from tin roofing work; hence this specification should be enforced to the letter.

#### "TIN ROOFING WORK"

"All tin used on this building shall be N. & G. Taylor Co.'s Target-and-Arrow brand. No substitute for this brand will be allowed. Use IC thickness for the roof proper, decks, etc., and IX thickness for valleys, gutters, and spouts, as required by design. One coat of red lead, iron oxide, metallic brown or Venetian red paint, with pure linseed oil, shall be applied to the under side of the tin before laying.

"For **flat-seam roofing**, edges of sheets to be turned one-half inch; all seams to be locked together and well soaked with solder. Sheets to be fastened to the sheathing-boards by cleats spaced eight inches apart, cleats locked in the seams and fastened to the roof with two one-inch barbed wire nails; no nails to be driven through the sheets.

"For **standing-seam roofing**, sheets to be put together in long lengths in the shop, cross seams to be locked together and well soaked with solder; sheets to be made up the narrow way in the rolls and fastened to the sheathing-boards by cleats spaced one foot apart.

\* See "Tin Roofers' Hand-Book," pp. 14-20, issued by the association. We have a supply and will send copies free on request.



“**Valleys and gutters** to be formed with flat seams well soldered, sheets to be laid the narrow way.

“**Flashings** to be let into the joints of the brick or stone work, and cemented. If counterflashings are used, the lower edge of the counter-part shall be kept at least three inches above the roof.

“**Solder** to be of the best grade, bearing the manufacturer's name, and guaranteed one-half tin and one-half lead, new metals. Use rosin only as a flux.

“**CAUTION.**—No unnecessary walking over the tin roof or using same for storage of material shall be allowed. In walking on the tin care must be taken not to damage the paint or break the coating of the tin. Rubber-soled shoes or overshoes should be worn by the men on the roof.

“**PAINTING TIN WORK.**—All painting of the tin work to be done by the roofer, using red lead, iron oxide, metallic brown, or Venetian red paint, with pure linseed oil—no patent dryer or turpentine to be used.

“All paints to be applied with a hand-brush and well rubbed on. Tin to be painted immediately after laying. A second coat shall be applied in a similar manner, two weeks later.

“No deviations from these specifications shall be made unless authority is given in writing by the architect. Only a first-class roof will be accepted.”

A supply of imitation typewritten copies of this specification will be furnished free of charge to any architect upon request.

## “THE ARROW”

This little illustrated publication, now in its Ninth Year of issue, is sent quarterly to architects and their draftsmen. We try to make it a breezy, instructive little magazine. Its small size makes it handy to be slipped into the pocket and read at leisure. We shall be glad to add to our mailing list the name of any architect who is not already getting this publication, if he will call our attention to the omission.

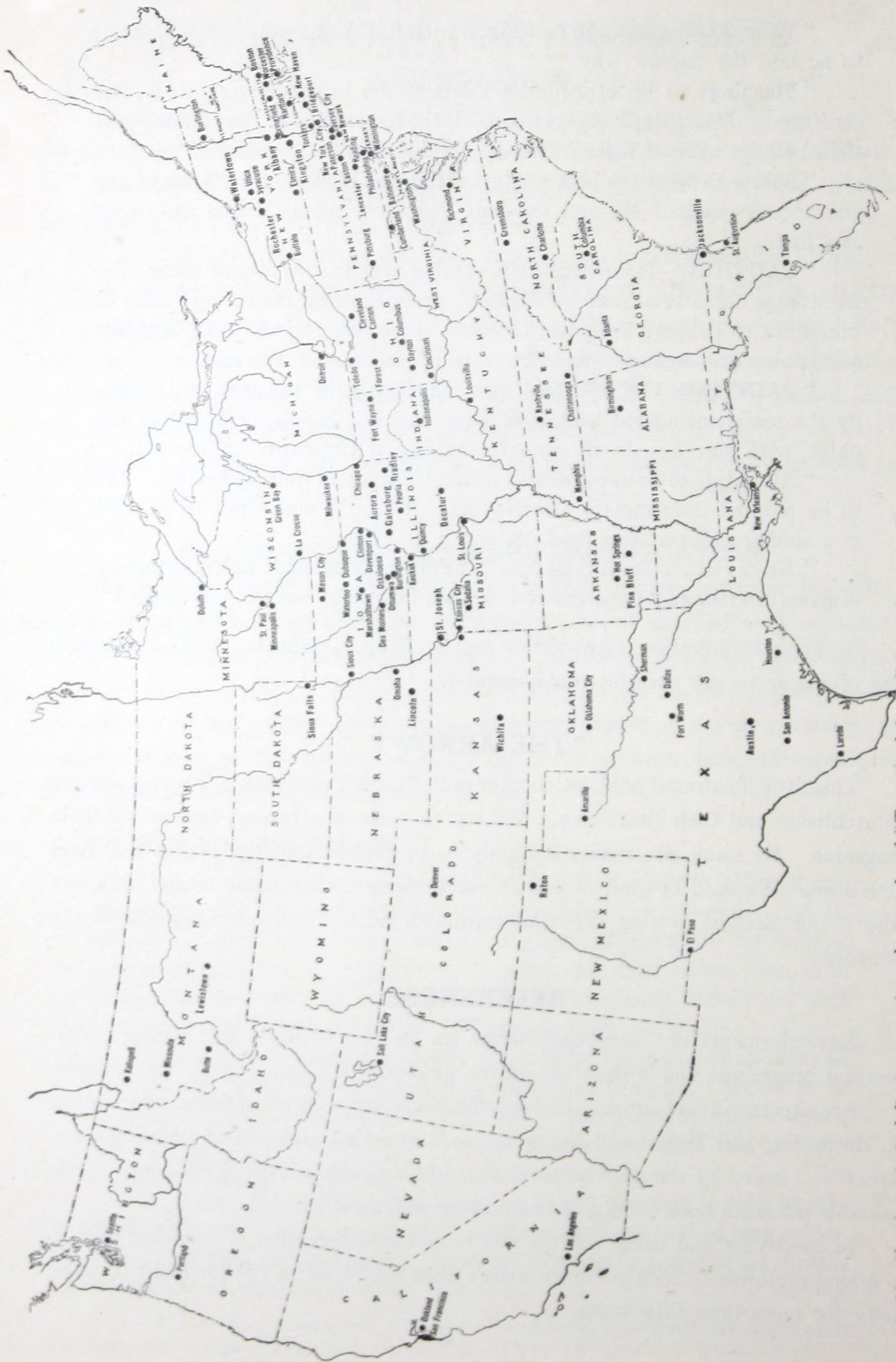
## REFERENCES

Advertisements of Target-and-Arrow tin will be found in the leading architectural magazines, and in the trade journals covering the sheet-metal roofing trade.

Architects will find our standard specification form, with other useful information on tin roofing and Target-and-Arrow tin, in “Sweet's Catalogue of Building Construction,” issued by the Architectural Record Company of New York City. This valuable reference book should be in every architect's office.

In specifying and using our tin you have the satisfaction of knowing that it is a long-established, widely known article that has stood in the limelight of publicity for more than fifty years.





Map showing principal distributing points where stocks of "Target-and-Arrow" tin are located. These stocks are carried either in warehouses or by leading wholesale hardware jobbers, or by our agents, whose names will be sent upon request. By this widespread distribution we assure a nearby source of supply of "Target-and-Arrow" tin for roofing work in any part of the United States



## A FEW OF THE BUILDINGS COVERED WITH TARGET-AND-ARROW TIN

Showing the wide use of this brand for permanent roofs on all kinds of buildings. Names of buildings mentioned in this book are shown in italics.

### RESIDENCES

Grover Cleveland Residence, Princeton, N. J.  
 Judge Henry Collins Residence, Manchester, O.  
 Thos. B. Wanamaker Residence, 1732 DeLancey Place, Phila., Pa.  
 Hugh L. Willoughby Residence, Newport, R.I.  
 John Fritz Residence, Bethlehem, Pa.  
 Frelinghuysen Residence, Tuxedo Park, N. Y.  
 E. B. Coxe Residence, 1431 Walnut St., Phila., Pa.  
 Ex. Gov. Pennypacker (of Penna.) Residence, Schwencksville, Pa.  
 Arthur E. Newbold Residence, Laverock, Pa.  
 W. G. McAdoo Residence (President Hudson River Tunnel Co.), Irvington-on-Hudson, N. Y.  
 Jas. B. Duke Residence, President The American Tobacco Co., Raritan, N. J.  
 H. M. Hill Residence, Minneapolis, Minn.  
 Ex-Senator J. D. Johnson Residence, Celina, O.  
 Sen. H. G. Davis Residence, Elkins, W. Va.  
 Hon. Alfred I. DuPont Residence, Wilmington, Del.  
 Ex-Governor W. J. Bailey Residence, Atchison, Kan.  
 A. P. Anthony Residence, (near) Washington, Ga.  
 Geo. C. Boldt Residence, Alexandria Bay, N.Y.  
 Rear Admiral Porter's Residence, Annapolis, Md.  
 E. Z. Wallover Residence, Harrisburg, Pa.  
*Residence at Osnaburg, O.*  
*George L. Baker Residence, Selma, Ala.*  
*H. W. Doughten Residence, Moorestown, N. J.*  
*Bierne Residence, Huntsville, Ala.*  
*Perkins Residence, Clyde, N. Y.*  
*Garretson Residence, Flushing, N. Y.*  
*M. Otis Hower Residence, Akron, O.*  
*Samuel Deemer Residence, Spring City, Pa.*  
*Ex-Governor Smith Residence, St. Albans, Vt.*  
*Langdon Residence, Clyde, N. Y.*  
*W. W. Gillespie Residence, Stamford, Conn.*

### BUSINESS BLOCKS, ETC.

"Dallas News" Building, Dallas, Texas.  
 Reading Hdwe Co. Building, Reading, Pa.  
 Eastman Kodak Building, Rochester, N. Y.  
 John Wanamaker Store, (Old Building), Phila., Pa.  
 Bausch & Lomb Optical Co., Rochester, N. Y.  
 German Insurance Building, Freeport, Ill.  
 The Welch Grape Juice Co. Building, Watkins, N. Y.  
 J. J. Shannon & Co. Hdwe Store, 18th and Market Sts., Phila.  
 Blackwell's Durham Tobacco Co. Building, Durham, N. C.  
 Pierce, Butler & Pierce Building, Syracuse, N.Y.

Isaac Walker Hdwe Co. Building, Peoria, Ill.  
 Parke, Davis & Co. Building, Detroit, Mich.  
 Mitchell, Fletcher & Co. Building, 1736 Chestnut St., Phila., Pa.  
 Dives, Pomeroy & Stewart Dep't. Store, Harrisburg, Pa.  
 Estey Piano Co. Factory, New York, N. Y.  
 Baltimore County Water & Electric Co. Building, Baltimore, Md.  
 Ashland Coal & Coke Co. Building, Keystone, W. Va.  
 The Cumberland Brewing Co. Building, Cumberland, Md.  
 Wanamaker & Brown Store, 6th and Market Sts., Phila., Pa.  
 Southwestern Market House, 19th and Market Sts., Phila., Pa.  
 Griffith Hdwe Co. Building, Girardville, Pa.  
 S. B. Hubbard & Co. Buildings, Jacksonville, Fla.  
*Volkman Building, San Francisco, Cal.*  
*Geo. B. Davis & Co., Philadelphia, Pa.*  
*Peters Hdwe Co. Building, Emporia, Kan.*  
*Music Hall Block, Red Wing, Minn.*  
*Wallenberg Co. Building, Beaver Dam, Wis.*  
*Abbott & Son, Marshalltown, Ia.*  
*Harrington Block, Portland, Ore.*  
*Wallace Bros. Co. Building, Lafayette, Ind.*  
*Bachrach Building, Decatur, Ill.*  
*New York Store, Indianapolis, Ind.*  
*Field Building, Denison, Tex.*

### BANKS, ETC.

Spokane National Bank, Spokane, Wash.  
 First National Bank, Olean, N. Y.  
 First National Bank, Ann Arbor, Mich.  
 Geneva National Bank, Geneva, N. Y.  
 Ithaca Trust Co., Ithaca, N. Y.  
 Chester National Bank, Chester, Pa.  
 City National Bank, Logansport, Ind.  
 First National Bank, Beaumont, Tex.  
 Union National Bank, New Castle, Pa.  
 Farmers State Bank, Oklahoma City, Okla.  
 Bank of Arizona, Prescott, Ariz.  
 First National Bank, Durango, Colo.  
 National Farmers Bank, Owatonna, Minn.  
 Crawford County Bank, Van Buren, Ark.

### FACTORIES, ETC.

Yawman & Erbe Co., Rochester, N. Y.  
 Winchester Repeating Arms Co., New Haven, Conn.  
 Stetson's Hat Factory, Philadelphia, Pa.  
 Lehigh Valley Silk Mills, South Bethlehem, Pa.  
 Abendroth Foundry, Port Chester, N. Y.  
 G. A. Bisler Box Factory, Philadelphia, Pa.  
 Lycoming Rubber Works, Williamsport, Pa.



International Lace Manufacturing Co., Gouverneur, N. Y.  
 Canadian General Electric Co., Toronto, Can.  
 Phila. Roll & Machine Co. (Machine Shop), Philadelphia, Pa.  
 The Collins Co. Buildings, Collinsville, Conn.  
 Owen Bros. Leaf Tobacco Factory, Clarksville, Va.  
 Electric Light Plant, Durango, Colo.  
 Cowikee Cotton Mill, Eufaula, Ala.  
 Pardee & Curtin Lumber Co. (3 mills), Curtin, W. Va.  
 Midvale Steel Works (Several Buildings), Philadelphia, Pa.  
 The American Fork & Hoe Co., Geneva, O.  
 Hamilton Watch Co., Lancaster, Pa.  
 Wm. Wood & Co. Mill, Philadelphia, Pa.  
 Vienna Pearl Button Co., Muscatine, Ia.  
 Detroit Lithographing Co., Detroit, Mich.  
*Chicago Varnish Co. Works, Chicago, Ill.*  
*Paper Pulp Mill, Harper's Ferry, W. Va.*  
*Hunsberger Warehouse, Philadelphia, Pa.*  
*Wetherill & Bro. Works, Philadelphia, Pa.*  
*Showers Bros. Co. Factory, Bloomington, Ind.*  
*American Pad & Textile Co., Greenfield, O.*  
*T. B. Jeffery Automobile Works, Kenosha, Wis.*  
*Savage Mfg. Co. Mill, Baltimore, Md.*  
*Hackney Wagon Co. Works, Wilson, N. C.*  
*Canadian Kodak Co., Toronto, Can.*  
*Eckert Furnaces, Reading, Pa.*  
*Standard Arms Co. Factory, Wilmington, Del.*  
*Hartford Carpet Corporation, Thompsonville, Conn.*

### RAILROAD BUILDINGS, ETC.

Central Vermont R. R. Depot, Burlington, Vt.  
 Pennsylvania R. R. Co., Supt.'s Office, 32d and Powelton Ave., Phila., Pa.  
 Shops of Butte, Anaconda, & Pacific Rwy. Co., Anaconda, Mont.  
 Erie R. R. Co., Chambers St. Ferry House, New York, N. Y.  
 Vandalia Line Passenger & Freight Stations, South Bend, Ind.  
 Pennsylvania R. R. Freight Depot, Fort Wayne, Ind.  
 Southern Rwy. Co. Depot, Louisville, Ky.  
 Union Passenger Station, Troy, Ala.  
 A. T. & S. F. R. R. Co. Elevator, Chicago, Ill.  
 C. R. I. & P. R. R. Freight House, Peoria, Ill.  
 Southern Railway, Freight House, Winston-Salem, N. C.  
 Norfolk & Western R. R. Passenger Station, Petersburg, Va.  
 R. F. & P. R. R. Co. Passenger Depot, Fredericksburg, Va.  
 Newburgh, Dutchess, & Conn. R. R. Roundhouse, Matteawan, N. Y.  
 Western Maryland R. R. Co. Terminal at Baltimore, Md., Sheds at Westminster, Md., etc.  
 Baltimore & Ohio R. R., Elevator B. Locust Point, Md.  
 Pennsylvania R. R. Co. Terminal, Broad St. Station (Part of Roof), Philadelphia, Pa.  
*New York Central & Hudson River R. R. Station, Albany, N. Y.*  
*C. B. & Q. Rwy. Freight Station, St. Louis, Mo.*

*Baltimore & Ohio R. R. Elevator "B," Locust Point, Md.*

*Ferry Terminal, St. George, Staten Island, N. Y.*  
*Boston & Maine R. R. Docks and Grain Galleries, Boston, Mass.*

*Norfolk & Western R. R. Station, Petersburg, Va.*

### MASONIC TEMPLES, ETC.

Masonic Temple, New Rochelle, N. Y.  
 I. O. O. F. Building, Cincinnati, O.  
 Masonic Temple, Detroit, Mich.  
 Odd Fellows' Hall, Columbus, O.  
 Odd Fellows' Hall, Rock Island, Ill.  
 Odd Fellows' Hall, Sherman, Tex.  
 Masonic Temple, Roanoke, Va.  
 Ancient and Accepted Scottish Rite Temple, Columbus, O.  
 Masonic Temple, Grand Rapids, Mich.  
 Masonic Building, Massillon, O.  
 Knights of Pythias Hall, Ann Arbor, Mich.  
 Odd Fellows' Hall, Dubuque, Iowa.  
 Temple of Joliet Masonic Association, Joliet, Ill.  
 Odd Fellows' Temple, Wilkesbarre, Pa.  
 Knights of Pythias Hall, New Albany, Ind.  
 B. P. O. Elks, Portsmouth, O.  
 Masonic Hall, Fredonia, N. Y.  
 Knights of Columbus Building, Poughkeepsie, N. Y.  
 Masonic Temple, Columbia, Pa.  
 Memorial Masonic Temple, Muskegon, Mich.  
 B. P. O. Elks Temple, Grand Junction, Colo.  
 Scottish Rite Temple, Dallas, Texas.  
 Masonic Temple, Pomona, Cal.  
 Odd Fellows' Lodge Building, Ft. Recovery, O.  
 Masonic Temple, Lewistown, Mont.  
 Masonic Hall, Canton, Miss.  
 Phi Kappa Sigma Frat. House, Phila., Pa.  
 Maccabee Temple, Auburn, N. Y.  
 Knights of Pythias Hall, Osage City, Kans.  
 Knights of Columbus Building, New Rochelle, N. Y.  
*Irem Temple, Wilkesbarre, Pa.*  
*Masonic Temple, Washington, D. C.*

### UNIVERSITIES, COLLEGES, ETC.

University of Pennsylvania (Numerous Buildings), Philadelphia, Pa.  
 University of Michigan (Several Buildings), Ann Arbor, Mich.  
 Syracuse University, Hall of Science, Syracuse, N. Y.  
 LaFayette College Dormitory, Easton, Pa.  
 Franklin and Marshall College, Science Hall and Preparatory School, Lancaster, Pa.  
 State University Buildings, Austin, Texas.  
 Vassar College, Poughkeepsie, N. Y.  
 Concordia College, Milwaukee, Wis.  
 Wooster University Laboratory, Wooster, O.  
 Milliken University Buildings, Decatur, Ill.  
 St. John's University, Collegeville, Minn.  
 Bucknell University Buildings, Lewisburg, Pa.  
 Santa Clara College, San Jose, Cal.  
 University of Illinois, Urbana, Ill.  
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 St. Francis College, Loretto, Pa.





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 A. and M. College, Stillwater, Okla.  
 Clarendon College, Clarendon, Texas.  
 Stetson University, Deland, Fla.  
 University of Missouri, Columbia, Mo.  
 Martha Washington College, Abingdon, Va.  
 University of Colorado, Boulder, Colo.  
 University of Rochester, Science Building, Rochester, N. Y.  
 University of Wyoming, Normal School Building, Laramie, Wyo.  
 Dartmouth College, Dormitory, Hanover, N. H.  
 Haskell Institute, Lawrence, Kansas.  
 Berea College, Berea, Ky.  
 Kansas State Agric. College, Shops, Manhattan, Kansas.  
 University of Minnesota, Men's Hospital Building, Minneapolis, Minn.  
 Randolph Macon College, Lynchburg, Va.  
*University of Colorado Power House, Boulder, Colo.*  
*Howard University, Carnegie Library, Washington, D. C.*

### CHURCHES, ETC.

St. Paul's Episcopal Church, Milwaukee, Wis.  
 St. Veronica's R. C. Church, New York, N. Y.  
 Church of the Immaculate Conception, Trenton, N. J.  
 Convent of Notre Dame, San Jose, Cal.  
 Our Lady of Lourdes Church, Waterbury, Conn.  
 St. Ann's Convent, Albany, N. Y.  
 St. Joseph's Convent, Clarksburg, W. Va.  
 Park Congregational Church, Philadelphia, Pa.  
 First Methodist Church, Ft. Worth, Texas.  
 Greek Church, Binghamton, N. Y.  
 Christ Episcopal Church, Chattanooga, Tenn.  
 United Presbyterian Church, Davenport, Iowa.  
 First Baptist Church, Lawrenceville, Kansas.  
 Dominican Convent, Blauvelt, N. Y.  
 Friends Meeting House, Philadelphia, Pa.  
 Synagogue for Temple Emanuel, Brooklyn, N. Y.  
 Church of the Atonement, Albany, N. Y.  
 St. Mark's Lutheran Church, Atchison, Kansas.  
 Luther Memorial Church, Orange, Texas.  
 Epiphany Church, Washington, D. C.  
 First Baptist Church, Oklahoma City, Okla.  
 Dominican Convent, Sparkill, N. Y.  
 First Presbyterian Church, Joplin, Mo.  
 Hungarian Catholic Church, South Norwalk, Conn.  
 Ingram Memorial Church, Washington, D. C.  
*Cathedral of St. Peter and St. Paul, Philadelphia, Pa.*  
*Immaculate Conception Cathedral, Denver, Colo.*  
*Old Swedes' Church, Philadelphia, Pa.*

### SCHOOLS, ETC.

Central High School, Manhattan, Kansas.  
 Pasadena High School, Pasadena, Cal.  
 Florida State Normal and Industrial School Library, Tallahassee, Fla.

Central High School (Addition), Detroit, Mich.  
 McCormick School, Washington, D. C.  
 Colman School, Seattle, Wash.  
 Helen Hall School, Ogdensburg, N. Y.  
 Rockwell School, New Britain, Conn.  
 McKinley Manual Training School, Washington, D. C.  
 High School, Atchison, Kans.  
 Arkadelphia High School, Arkadelphia, Ark.  
 Milford High School, Milford, Del.  
 Carroll Robbins School, Trenton, N. J.  
 High School, Niagara Falls, N. Y.  
 Henry St. Public School, Savannah, Ga.  
 Broadway School, Newburgh, N. Y.  
 St. John's Industrial School, Deep River, Conn.  
 St. Anthony's School, Kansas City, Kansas.  
 Country School for Boys, Roland Park, Md.  
 Maysville High School, Maysville, Ky.  
 Westernport Public School, Piedmont, W. Va.  
 St. Mary's Parochial School, Oswego, N. Y.  
 High School, Lees Summit, Mo.  
*St. Vincent de Paul's Parochial School, Germantown, Pa.*  
*State Normal School, Weatherford, Okla.*  
*High School, Wilmington, Del.*  
*Queen Anne High School, Seattle, Wash.*  
*School of Applied Design for Women, New York, N. Y.*  
*Cutler Academy, Colorado Springs, Colo.*  
*High School, Carthage, Mo.*

### PUBLIC BUILDINGS, COURT HOUSES, ETC.

City Hall, Spokane, Wash.  
 City Hall, Massillon, O.  
 City Hall, Bay City, Mich.  
 City Hall, Jacksonville, Ill.  
 State House, St. Paul, Minn.  
 Court House, Fort Worth, Texas.  
 Court House, Dubuque, Iowa.  
 Court House, Dallas, Tex.  
 Court House, Syracuse, N. Y.  
 State Library, Lawrence, Kans.  
 City Hall, Sumter, S. C.  
 Public Library, Peoria, Ill.  
 City Hall, Elkhart, Ind.  
 State Arsenal, Rochester, N. Y.  
 State Armory, Flushing, N. Y.  
 Court House, Omaha, Neb.  
 City Hall, Richmond, Va.  
 City Hall, Bradford, Pa.  
 Court House, Kearney, Neb.  
 City Hall, Appleton, Wis.  
 Court House, Traverse City, Mich.  
 Court House, Mt. Vernon, O.  
 Court House, Paterson, N. J.  
 City Hall, Waterbury, Conn.  
 City Hall, Spartansburg, S. C.  
 Court House, Beaufort, N. C.  
 City Hall, Shreveport, La.  
 City Hall, Pendleton, Ore.  
 City Hall, Flint, Mich.  
 City Hall, Wichita Falls, Tex.  
 Court House, Nashville, Tenn.  
 Court House, Santa Fe, N. M.  
 City Hall, West Point, Miss.  
 City Hall, Anadarko, Okla.  
 Court House, Norwich, Conn.  
 Town Hall, Homer, N. Y.



City Hall, Portsmouth, Va.  
 Court House, Portsmouth, Va.  
 City Jail, Portsmouth, Va.  
 City Elec. Light Plant, Oberlin, Kansas.  
 Court House, Freeport, Ill.  
 City Water Works, Batavia, N. Y.  
 City Hall, Montrose, Colo.  
 City Power House, Oberlin, Kansas.  
 City Hall, Silverton, Colo.  
 Court House, Jerseyville, Ill.  
*Fremont County Court House, St. Anthony, Idaho.*  
*Independence Hall, Philadelphia, Pa.*  
*Executive Offices, Washington, D. C.*  
*Court House, Huntsville, Tex.*

### HOTELS, ETC.

Grand Central Hotel, Columbia, S. C.  
 Ponce DeLeon Hotel, Atlantic City, N. J.  
 Terminal Hotel, St. Louis, Mo.  
 West End Hotel, New Orleans, La.  
 New Southern Hotel, Muncie, Ind.  
 Barnett Hotel, Logansport, Ind.  
 Hotel Webster, Fargo, N. D.  
 Hotel Racine, Racine, Wis.  
 Hale Hotel, Butte, Mont.  
 St. Lawrence Inn, Gouverneur, N. Y.  
 Grandon Hotel, Helena, Mont.  
 Tampa Bay Hotel, Tampa, Fla.  
 Hotel Baldwin, Logansport, Ind.  
 Hotel Berkeley, Atlantic City, N. J.  
 Hotel Rudolf, Atlantic City, N. J.  
 Hotel Traymore, Atlantic City, N. J.  
 Hotel Albert, Selma, Ala.  
 Hotel Champlain, Plattsburgh, N. Y.  
 Lenox Hotel, Lakewood, N. J.  
 The Dodge House, Tuxedo Park, N. Y.  
 Leland Hotel, Springfield, Ill.  
 The Oliver, South Bend, Ind.  
 Curtis Hotel, Lenox, Mass.  
 Deadwood Hotel, Deadwood, S. D.  
 Grand Union Hotel, Portchester, N. Y.  
 Reed Hotel, Erie, Pa.  
 Cook's Hotel, Rochester, Minn.  
 Hotel Brunswick, Asbury Park, N. J.  
 Thurston Hotel, Columbus, Neb.  
 New Gaston Hotel, New Bern, N. C.  
 Berkshire Hotel, Reading, Pa.  
 Hotel Burlington, Burlington, Vt.  
 Metropolitan Hotel, Washington, D. C.  
*Tremont Hotel, Houston, Tex.*  
*Marlborough Hotel, Atlantic City, N. J.*  
*Trenton House, Trenton, N. J.*

### U. S. GOVERNMENT BUILDINGS

Ft. Sam Houston (Numerous Buildings), San Antonio, Tex.  
 Columbus Barracks, Columbus, O.  
 Soldiers' Home, Grand Island, Neb.  
 West Point Military Academy (Numerous Buildings), West Point, N. Y.  
 Soldiers' Home, Milwaukee, Wis.  
 Soldiers' Home, Marion, Ind.  
 Ft. Niagara (Several Buildings), Ft. Niagara, N. Y.  
 U. S. Immigrant Station, Ellis Island, N. Y.  
 Barracks, Sacketts Harbor, N. Y.  
 U. S. Custom House, Bath, Me.

Barracks, Ft. Harrison, Mont.  
 Ft. Hamilton (Numerous Buildings), Governor's Island, New York Harbor.  
 Ft. Mifflin (Numerous Buildings), Delaware Bay, Phila.  
 Soldiers and Sailors Home, Sandusky, O.  
 Ft. Ethan Allen (Numerous Buildings), Vermont.  
 Ft. Riley (Numerous Buildings), Ft. Riley, Kan.  
 Officers' Quarters, Jefferson Barracks, Mo.  
 Officers' Quarters, Ft. Meyer, Va.  
 Custom House, New Haven, Conn.  
 Officers' Quarters, Ft. Wayne, Mich.  
 Custom House, Portland, Me.  
 Ft. Yellowstone, Yellowstone Natural Park, Wyo.  
 Officers' Quarters, Fort Crook, Neb.  
 Ft. Leavenworth (Numerous Buildings), Ft. Leavenworth, Kan.  
 League Island Navy Yard, Philadelphia, Pa.  
 Barracks and Quarters, Ft. Monroe, Va.  
 Ft. Hancock, Sandy Hook, N. J.  
 National Home for D. V. S., Danville, Ill.  
 U. S. Indian School, Anandarko, Okla.  
 U. S. Hospital Buildings, Presidio, San Francisco, Cal.  
 Ft. Warren, Boston Harbor, Mass.  
 Ft. Douglass, Salt Lake City, Utah.  
 Michigan Soldiers' Home, Grand Rapids, Mich.  
 U. S. Naval Hospital, Officers' Quarters, etc., Mare Island, Cal.  
 U. S. Navy Buildings, Ft. Stevens, Ore.  
 Naval Training School, Yerba Buena Island, Cal.  
 Soldiers' Home, Hampton, Va.  
 U. S. Naval Magazine, Iona Island, N. Y.  
 Ft. Adams, Newport, R. I.  
 Barracks, Officers' Quarters, etc., Ft. Meade, S. D.  
 Fort DuPont, Delaware City, Del.  
 Ft. Washington, Washington, D. C.  
 Ft. Screven, Tybee Island, Ga.  
 Chickamauga Park (65 Buildings), U. S. Military Post, Chattanooga, Tenn.  
 National Soldiers' Home, Leavenworth, Kan.  
 Post Exchange and Gymnasium, Ft. Wadsworth, N. Y.  
*Ft. Adams (Numerous Buildings), Newport, R. I.*  
*U. S. Life Saving Service (Numerous Buildings on the Atlantic sea-coast).*

### INSTITUTIONS, ASYLUMS, ETC.

Northern Michigan Insane Asylum, Traverse City, Mich.  
 Deaf and Dumb Asylum, Jacksonville, Ill.  
 Ogdensburg Asylum, Ogdensburg, N. Y.  
 State Asylum for Feeble-minded Children, Syracuse, N. Y.  
 St. Ann's Hospital, Anaconda, Mont.  
 St. Vincent's Hospital, Green Bay, Wis.  
 Montefiore Home for Consumptives, Bedford, N. Y.  
 St. Vincent's Orphan Asylum, Syracuse, N. Y.  
 City Hospital, Charleston, W. Va.  
 Deaf and Dumb Asylum, Rome, N. Y.  
 Lutheran Home, Mt. Airy, Germantown, Phila.  
 Philadelphia Hospital, Philadelphia, Pa.  
 Children's Hospital, Cleveland, O.



State Hospital, St. Peter, Minn.  
 Almshouse, Galesburg, Ill.  
 St. Mary's Hospital, Rochester, N. Y.  
 County Poor Farm, Morrison, Ill.  
 Home for the Aged and Infirm, Louisville, Ky.  
 Baron de Hirsch Agricultural and Industrial  
 School, Woodbine, N. J.  
 St. Joseph's Home, Peoria, Ill.  
 Delaware Hospital, Wilmington, Del.  
 Wisler Memorial Home, Chalfont, Pa.  
 Pottsville Hospital, Pottsville, Pa.  
 Home for the Aged, Cincinnati, O.  
 San Jose Sanitarium, San Jose, Cal.  
 Orphan's Home, Weatherford, Tex.  
 Almshouse, Richmond, Va.  
 I. O. O. F. Orphan's Home, Checotah, Okla.  
 Maloney Home for the Aged, Scranton, Pa.  
 Michigan Asylum for Insane, Kalamazoo, Mich.  
 St. Mary's Hospital, Waterbury, Conn.  
 New York Juvenile Asylum, Dobb's Ferry, N. J.  
 Sanitarium Sisters of the Incarnate Word, Lake  
 Charles, La.  
 St. Mary's Hospital, Clarksburg, W. Va.  
 State School for Deaf and Blind, St. Augustine,  
 Fla.  
 St. Anthony's Hospital, Kansas City, Kan.  
 New York Reformatory for Women, Bedford,  
 N. Y.  
 Children's Hospital, Washington, D. C.  
 Davis Memorial Hospital, Elkins, W. Va.  
 Northampton State Hospital, Northampton,  
 Mass.  
 Utica State Hospital, Utica, N. Y.  
 St. Mary's Hospital, Waterbury, Conn.  
 The St. Francis Home, New York, N. Y.  
 Connecticut Insane Hospital, Middleton, Conn.  
*St. Margaret's Hospital, Kansas City, Mo.*  
*Odd Fellows' Orphanage, Goldsboro, N. C.*  
*Philadelphia Almshouse, Philadelphia, Pa.*

### JAILS, REFORMATORIES, ETC.

St. Lawrence County Jail, Canton, N. Y.  
 McPherson County Jail, McPherson, Kan.  
 Dakota Penitentiary, Sioux Falls, S. D.  
 Jail, Abilene, Tex.  
 Indiana State Prison, Michigan City, Ind.  
 Reformatory, Lancaster, O.  
 New York State Reformatory, Elmira, N. Y.  
 King's County Penitentiary, Long Island, N. Y.  
 Miami County Jail, Peru, Ind.  
 Missouri State Penitentiary, Jefferson City, Mo.  
 State Prison, Hartford, Conn.  
 Jail, Paterson, N. J.  
 Jail, Covington, Va.  
 Jail, Lexington, N. C.  
 Bedford County Jail, Bedford City, Va.  
 Montgomery County Jail, Hillsboro, Ill.  
 Pine County Court House and Jail, Ely, Nev.  
 Jail, Brunswick, Ga.  
 State Penitentiary, McAlester, Okla.  
 Jail, Franklinton, La.  
 Pennsylvania Industrial Reformatory (Wall and  
 Several Buildings), Huntingdon, Pa.  
 Vermont State Prison, Windsor, Vt.  
 McLernan County Jail, Waco, Tex.  
 Jail, Blytheville, Ark.  
 Dallas County Jail (Addition), Dallas, Tex.  
 Jail, St. Bernard, La.

United States Jail, District of Columbia, Wash-  
 ington, D. C.  
*Eastern Penitentiary, Philadelphia, Pa.*

### MISCELLANEOUS BUILDINGS

Kansas City Stock Yards, Kansas City, Mo.  
 Sanitarium Buildings, Battle Creek, Mich.  
 Fairmount Park (Numerous Buildings), Phila-  
 delphia, Pa.  
 Cleveland Electric Rwy. Car Barns, Cleveland, O.  
 State Militia Building, State Camp Ground,  
 Peekskill, N. Y.  
 S. S. White Dental Depot, 12th and Locust  
 Sts., Philadelphia, Pa.  
 T Square Club, Philadelphia, Pa.  
 Union League, Philadelphia, Pa.  
 Reynolds Library, Rochester, N. Y.  
 Armory, Newark, N. J.  
 Great Northern Elevator Co., West Superior,  
 Wis.  
 Saratoga Armory, Saratoga, N. Y.  
 47th Regiment Armory, Brooklyn, N. Y.  
 Crematorium, Washington, D. C.  
 Houston Country Club, Houston, Tex.  
 Campus Club, Princeton, N. J.  
 Pillsbury Settlement House, Minneapolis, Minn.  
 Jas. B. Duke's Farm, Raritan, N. J.  
 General Electric Co., Pittsfield, Mass.  
 Wilmington Armory, Wilmington, Del.  
 Willard Canal Transformer House, Ontario, Can.  
 City Pumping Station, 6th and Lehigh Ave.,  
 Phila., Pa.  
 Elevated Railway Stations, Interborough Co.,  
 New York, N. Y.  
 Crematory, Tacoma, Wash.  
 Michell's Seed Farm, Torresdale, Pa.  
 Opera House, Stevens Point, Wis.  
 Oberlin Opera House, Oberlin, Kan.  
 Grand Opera House, Terre Haute, Ind.  
 E. H. Taylor, Jr. & Sons, Distillery, Frankfort,  
 Ky.  
 Deppen Brewing Co., Reading, Pa.  
 The Brooklyn Brewery, Brooklyn, N. Y.  
 Schlitz Brewing Co., Lincoln, Omaha, Beatrice,  
 Neb.  
 National Brewing Co., Syracuse, N. Y.  
 Allentown Brewing Co., Allentown, Pa.  
 Adam Scheidt Brewing Co., Norristown, Pa.  
 W. A. Gaines & Co., "Old Crow" Distillery,  
 Frankfort, Ky.  
 Barns at State Hospital, Ogdensburg, N. Y.  
 Bergdoll Brewing Co.'s Stable, Phila., Pa.  
 Bausch & Lomb's Stables, Rochester, N. Y.  
 Finley Acker & Co.'s Stables, Phila., Pa.  
 Otto Snyder's Livery Barn, Muscatine, Iowa.  
 Garage, Andrew Carnegie, New York, N. Y.  
 Bert Steere Barn, Afton, N. Y.  
 Garage, Col. Simons, Washington, D. C.  
 Coach Stables, W. K. Vanderbilt, Oakdale, N. Y.  
 Mercer Bottling Co. Stables and Wagon Sheds,  
 Trenton, N. J.  
 Stables, H. Carroll Brown Estate, Brooklandville,  
 Md.  
*Carnegie Library, Frankford, Pa.*  
*State Armory, Medina, N. Y.*  
*Norristown Opera House, Norristown, Pa.*  
*Franklin Institute, Philadelphia, Pa.*



## SOME TAYLOR PRODUCTS

Since the early days of our business we have been specialists in roofing tin and bright tin of the highest quality. The high standards established in the early days of the industry have been carefully maintained in making our plates, formerly at our Works in Wales, and later, in recent years, in this country.

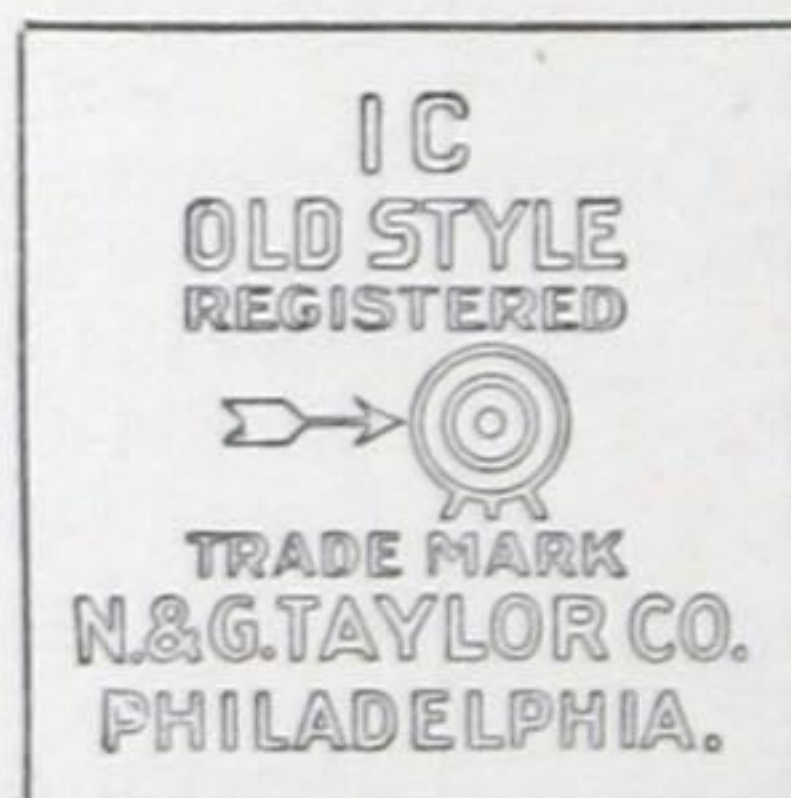
We have our own open-hearth furnaces, rolling mills, black plate plant and tinplate works, controlling all the processes of manufacture from the pig iron and pig metals through to the finished sheet, under our own direction and supervision. For a number of years we were the only manufacturers controlling all the processes in this way. No part of the work of making our plates is done outside our works. Everything, from start to finish, is under our personal direction.

We have had a long and thorough experience in this line of business; that experience is in our products.

## LEADING BRANDS OF ROOFING TIN

### "TARGET-AND-ARROW ROOFING TIN"

Formerly known as the "Taylor Old Style" brand



Fac-simile of trade-mark embossed on each sheet  
Registered in the U. S. Patent Office

This is our highest grade plate, made by our old-time strictly hand-dipping Welsh process, using the best materials throughout. This process is slow, tedious, and costly, employing the highest skilled labor.

Read the following facts about this well-known product:

1. It is the original, pioneer "Old Style" brand, introduced by us many years ago and since imitated by nearly every other tinplate house.
2. The oldest brand on the market, and in our opinion the highest grade of roofing tin that can be made at any cost. The high standard set for this old brand in the early days of the industry has always been maintained in the face of every competition.
3. Exactly the same durable quality of roofing tin that we have supplied to the American sheet metal roofing trade for more than sixty years.
4. This tin has been known in many cases to last in good condition for more than fifty years on the roof. Experience has shown that no other roofing material stands the test of time like "TARGET-AND-ARROW" tin, and we know of no other tin that approaches it in quality.
5. It is generally recognized as the highest standard for roofing tin in this country.

Furnished in any standard thickness: IC, IX, 2X, etc. Standard sizes, 14" x 20" and 28" x 20", packed 112 sheets to the box. Odd sizes can be made to order.

Shipping weights: IC, 260 lbs.; IX, 320 lbs.; 2X, 360 lbs., etc.



## **"THE TAYLOR ROOFING TIN, RE-DIPPED"**

Heavily and evenly coated over the entire sheet by a special process of our own. An exceptionally fine quality, equal to the best of the "old method" and imitation "old style" plates. For many years a favorite for use where competition does not permit the use of the best. Carries a rich, heavy coating, showing a large bright mottle.

Shipping weights: IC, 250 lbs.; IX, 306 lbs.

## **"N. E."**

This is one of our brands of extra-coated terne, much favored for use in New England (hence the name) and on the Eastern Seaboard. In that severe climate it has given satisfactory results. Richly and heavily coated by the palm-oil process, and carries 32 lbs. coating. Has taken the place of the quality formerly furnished in the imported "M. F." brand. We consider it the peer of other extra-coated plates on the market, all of which are coated in the modern way, by machinery, and lack the durability of our strictly hand-made tin.

Shipping weights: IC, 252 lbs.; IX, 308 lbs.

## **"COLUMBIA, EXTRA-COATED"**

A clean, high-grade, extra-coated terne, beautifully mottled. Made on our special open-hearth base, especially recommended for softness, ductility, and resistance to corrosion.

A popular medium-priced plate, a favorite with the trade for 25 years.

We sell a great deal of this brand for use where a good, standard, extra-coated roofing-tin is required.

Shipping weights: IC, 240 lbs.; IX, 296 lbs.

## **"KNOXALL"**

An excellent plate for common roofing work at a reasonable cost. For many years considered the best plate obtainable at the price. Open-hearth base, 10 lb. coating.

Shipping weights: IC, 228 lbs.; IX, 284 lbs.

All of these brands of tin are resquared and stamped with the name of the brand and thickness.

## **EXTRA COATED TERNE**

We make these to order to meet competition, in all weights of coating from 12 lbs. up to 40 lbs., 28" x 20", and in any desired finish.

## **ROOFING TIN IN ROLLS, OR GUTTER STRIP**

We are prepared to furnish any of these brands of roofing tin put up in rolls ready to lay on the roof, in perfectly straight lengths, seams single or double-locked, and thoroughly soldered by hand, using good solder and rosin flux. Desirable for dealers who keep no tinmen, or for work at a distance from the shop, as the tin is ready for use upon arrival at the depot.

Freight the same as on tin in boxes. Any grade, width, length, or thickness. Painted on one or both sides.

**SPECIALTY.**—"Taylor's Fire Protection Terne." A special terne plate for covering fire-doors and shutters. Made in strict accordance with the specifications of the National Board of Fire Underwriters and the National Fire Protection Association. Guarantee packed in each box. Furnished only in IC thickness, 14" by 20" size, packed 112 sheets to the box.

Shipping weight, 120 lbs.

## **BRIGHT TIN PLATE**

We are fully equipped for the manufacture of the highest grades of bright tin, and have had a long experience in this line of work. These plates are made in our works at Cumberland, Md., and at Philadelphia, where we control, under our own supervision, all the processes in converting pig iron and pig metals to the finished sheet. Many of these processes are delicate and difficult, calling for a high degree of skill that can only be gained from long experience.



The black plate used is our special make of open-hearth steel, which we are prepared to furnish in various grades of quality suited to different classes of work.

We also make the cheaper grades, but since our bright tin production is almost entirely in first-class charcoal plates, this good quality is reflected in our cokes, which run better than the usual standard.

**BRILLIANT.** Tissue paper packed, extra fine quality, richly and heavily coated, extra hand cleaned. Made of selected materials in a special manner through palm oil. The heavy coating is very tedious to apply. Intended only for highest grade work.

**ROYAL.** Tissue paper packed, extra hand cleaned. A beautiful, finished plate; a choice tin for high-grade work. Well assorted, heavily coated; made in the best manner through palm oil.

**MERION.** Tissue paper packed, extra hand cleaned. A fine plate, well finished, similar in finish to "Royal," but not so heavily coated. Also made through palm oil.

**LINDEN.** Extra hand cleaned, not tissue paper packed. Carries less coating than "Merion." Made through palm oil.

**ELM.** Seven-pound coating, medium price and quality.

**MYRTLE.** Six-pound coating.

**ALMOND.** 4½- to 5-lb. coating, according to gauge. Fair coating, good for ordinary work.

## EXTRA LARGE SHEETS

### Large Tinned Sheets

Made in three grades of coating. All Gauges. Widths up to 44 inches. Lengths up to 120 inches. Carefully packed with tissue paper. Leading sizes always in stock.

### Large Terne Sheets

Smooth finish, well coated by our special process. Widths up to 44 inches. Lengths up to 120 inches. All Gauges. Packed in bundles, crates, or wooden cases.

## BLACK PLATE

As large manufacturers, we are prepared to furnish any quality for surface finish, softness, ductility (tensile strength), toughness, stiffness, etc., within reasonable limits. Our regular black plate is adapted to the finest uses, and is of exceptionally high finish, but we can furnish any degree of hot or cold rolling, annealing, pickling, etc. Our raw materials are carefully selected and we have our own open-hearth furnaces and rolling mills, sheet mills and black plate plant, all of which are necessary to secure the results that the character of our business requires. We are regularly supplying some of the largest and most critical users in this country.

**Limits.**—All sizes up to the limits of black plate manufacture, about 26" by 36" maximum. All gauges from No. 16 down to No. 38, U. S. Standard.

## SOLDER

We are probably the oldest makers of solder in this country. Established in 1810, we have been making solder since the early years of our business. We have separate works for this branch of our business, with special furnaces for smelting and refining the materials we use. Requiring, as we do, large quantities of pig tin and pig lead for our tinplate works, we buy these metals at the lowest prices, and can give our customers a corresponding advantage in our prices for the finished solder. Our grades are as follows:

### " HENDY "

Well known in all parts of this country as the highest standard for use on high-grade tin roofing work. Better than "Half and Half" or "100 to 100" solder

### " N. & G. T. Co.'s 100 to 100 "

### " OLD STYLE "

### " ROYAL "

### " MARKET "

### " 40 to 60 "

### " PLUMBERS' WIPING "

We furnish these solders in all the various forms: bar, slab, cake, triangle, ribbon, drops, segments, wire, etc., as required.

## TINNERS' TOOLS AND MACHINES

We handle a complete line of these. Illustrated catalogue sent upon request.



# LIST OF USEFUL BOOKS

## FOR SHEET METAL ROOFERS

Orders for these may be sent to us or direct to the publishers.

**"The Roofing, Cornice and Skylight Manual,"** 175 pages, 170 illustrations, 13 plates. Size 6 x 9½ in. Cloth. \$1.50.

**"Sheet Metal Work."** Price \$3.00.

**Tables,** giving the length of bars for skylights and rafters for roofs. 84 pages; bond paper, pocket size. Cloth. 50c.

Set "C,"	Perfect Blue Print Patterns,	for Skylight,	...	\$3.50
Set "D,"	"	"	"	4.00
Set "E,"	"	"	"	4.50
Set "F,"	"	"	"	3.00
Set "G,"	"	"	"	2.00
Set "I,"	"	"	"	3.00
Set "L,"	No. 1	"	"	2.50
Set "L,"	No. 2	"	"	3.00

**The Metal Worker Shop Card No. 1.** Table of the quantity of tin required for roofs. 10½ x 14 in. Metal eyeletted for hanging, 25c.

**"Tinsmiths' Helper and Pattern Book,"** with useful rules, diagrams and tables, by H. K. Vosburgh. A new, revised edition, 120 pages, 53 figures. Size 4½x6¾ in. Cloth. \$1.00.

**The New Metal Worker Pattern Book.** A treatise on pattern cutting as applied to all branches of sheet metal work. A complete exposition of the subject. The sheet-metal worker who masters the contents of this book is qualified as a finished pattern cutter. By George W. Kittredge, 430 pages, 74 illustrations. Size 10 x 13 in. Cloth. \$5.00.

### Practical Sheet Metal Work, and Demonstrated Patterns.

Volumes I to IV, as follows:

Volume I,	Leaders and Leader Heads	...	\$1.50
Volume II,	Gutters and Roof Outlets	...	1.50
Volume III,	Roofing	...	1.50
Volume IV,	Ridging and Corrugated Iron Work,	...	1.50

**"Easy Lessons in Roof Measurements,"** 25c.

All the above books supplied by David Williams Company, 239 West 39th St., New York, N. Y. Publishers of **"Metal Worker, Plumber and Steam Fitter,"** issued weekly. Covers the ventilating, heating, plumbing, lighting, sheet-metal and stove industries. Subscription, one year, postpaid, \$2.00.

**"XX Century Sheet Metal Worker,"** by H. E. Osborne. Price, flexible cover, 60c; cloth bound, \$1.00.

**"Sheet Metal Worker's Instructor,"** by Joseph H. Rhodes. Containing practical rules for describing the various patterns for sheet-iron, copper and tin work. Useful information on various matters of special interest to metal workers. 310 pages, 200 illustrations. Cloth. Price \$2.00.

**"The Cornice Worker's Manual,"** by S. P. Johnston. Illustrated. Showing the tools necessary for different kinds of work in the sheet metal trade. Also cornice work, finished and in various stages of the work. Cloth bound, \$3.50.

The above books published by Daniel Stern, 537 So. Dearborn St., Chicago, Ills. Also publisher and proprietor of the **"American Artisan and Hardware Record,"** of Chicago; issued weekly. Representing the stove, tin, hardware, heating and ventilating interests. Subscription, one year, postage paid, \$2.00.



**"Engineering Review of Heating, Ventilating, Plumbing, Metal Working, Lighting, etc."** Published monthly by Engineering Review Co., 231-241 West 39th St., New York, N. Y. Subscription, one year, postpaid, \$1.00

**"The Sheet Metal Shop and Pattern Cutters' Magazine,"** published monthly by the Sheet Metal Publication Co., Tribune Building, New York, N. Y. Subscription, one year, postpaid, \$1.00.

**Gray's School of Sheet Metal Pattern Drafting,** 35-37 Third Avenue, New York, N. Y. Covering cornice, heating and ventilation work. A course of home study in sheet-metal pattern drafting taught by correspondence. Full information on cost of scholarship, drawings, instruction sheets, etc., furnished upon application to G. L. Gray, proprietor.

**Official Cost and Handbook,** 400 pages, 7x11½ in. Bound in loose-leaf cover. Contents comprise every item of stock, tools, material, etc., used by roofers, tinnerns, sheet-metal workers, heating and ventilating engineers, master plumbers, and gas fitters. Carefully selected, grouped and indexed. Officially adopted by several State organizations. Published by the Price Book Publishing Co., Post Office Box 1292, New Haven, Conn. Cost, \$5.00.

**"Sheet Metal Work,"** by William Neubecker, Instructor Sheet Metal Department of New York Trade School; 320 pages, 380 illustrations, half-morocco binding. A complete manual of practical self instruction in the art of pattern drafting, for light and heavy gauge metal skylight work and roofing, cornice work, etc. Price \$3.00. Published by the American School of Correspondence, Chicago, Ills.

**"Target-and-Arrow" shop card,** giving tables and weights on tin roofing work, for shop reference. Printed on heavy cardboard, 8½ x 12 in. Sent postpaid by N. & G. Taylor Co., of Philadelphia.

**"Tin Roofers' Handbook,"** containing a brief history of tin roofing, summary of the advantages of a good tin roof, standard working specifications, practical hints on tin roofing, etc. Published for the National Association of Sheet Metal Contractors. Sent postpaid by N. & G. Taylor Co., Philadelphia.

**Standard Roofing Specification,** for architects' use, conforming to the Standard Working Specifications of the National Association of Sheet Metal Contractors. Furnished free upon request. State number of copies wanted. N. & G. Taylor Co., Philadelphia.

**"Instructions to Salesmen,"** containing 23 selling pointers for tin roofing, and 37 pointers for Target-and-Arrow tin. Intended for distribution to salesmen, agents and representatives, but an interesting and valuable handbook to the sheet-metal roofer as well. Size 3½x5¼ in., 23 pages. N. & G. Taylor Co., Philadelphia.

**"Target-and-Arrow" building sign,** for display on buildings where this tin is used. Printed in three colors. Size 5 x 2 feet. Made of waterproof fibre. Can be used again and again. Easily put up with tacks or small nails. Name and address of the roofer printed in large type on each sign. Furnished free upon request, by N. & G. Taylor Co., Philadelphia.

**"Target-and-Arrow" shop posters,** similar to the building sign, for shop or office decoration. Size 5 x 3 feet. Sent free upon request. Packed in a strong mailing tube. N. & G. Taylor Co., Philadelphia.

**"Target-and-Arrow" store front display sign,** made of heavy metal with flanged edge. Finished in two colors, size 10 x 14 in. Sent free upon request to any of our friends in the trade. N. & G. Taylor Co., Philadelphia.

**Samples of Taylor tin.** A representative batch of samples of our leading brands of roofing tin; not the usual sharp-edged, irregular bunch of plates, but a neat, attractive package; samples die-cut with rounded edges. Furnished free upon request. N. & G. Taylor Co., Philadelphia.

**"A Guide to Good Roofs."** A 24-page booklet giving information on Target-and-Arrow tin. For distribution to property owners, architects, contractors, etc. Let us know how many of these you can use, to send out in your mail. Sample copies furnished on request. N. & G. Taylor Co., Philadelphia.

**"Interesting Facts about Tin Roofs."** A leaflet for envelope enclosure, giving a number of convincing arguments in favor of good tin for permanent roofing work. Let us know how many copies you can use, imprinted with your name and address and advertisement of your business. N. & G. Taylor Co., Philadelphia.

**"Painting Tin Roofs."** A short treatise on this subject. Copies furnished on request by N. & G. Taylor Co., Philadelphia.

*Any of the above-mentioned publications may be ordered through  
N. & G. Taylor Co., Philadelphia, at the prices quoted.*







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